Five-Year Review Report

Third Five-Year Review Report

for

MIDCO II

Gary

Lake County, Indiana

March 2008

PREPARED BY:

Region 5, U.S. Environmental Protection Agency
Chicago, Illinois

Approved by:

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Richard Karl, Director
Superfund Division

Date:

3-12-09

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Table 1-1, List of Project-Specific Quantitation Limits Midco I and II Sites, *2005 Ground Water Monitoring Report*, ENVIRON, May 2006.

Figure II-6, Capture Zone Analysis, letter re: revised 2005 Capture Zone Analysis, ENVIRON, May 9, 2006

Groundwater Contour Map – 8/13/08, ENVIRON.

Table 5-2, Summary of Comparison of Analytical Results with Cleanup Action Levels, *2004 Annual Ground Water Monitoring Report*, ENVIRON, May 2005.

Table 5-2, Summary of Comparison of Analytical Results with Cleanup Action Levels, *2008 Annual Ground Water Monitoring Report*, ENVIRON, October 2008.

Figure showing VOC trends in monitoring well E10, ENVIRON, November 2008

Figure showing VOC trends in monitoring well R10, ENVIRON, November 2008

Figure showing VOC trends in monitoring well R10, ENVIRON, November 2008.

Figure 15, Total Iron Concentrations – Monitoring Wells MW-4D, F-10, and R-10, *2008 Annual Ground Water Monitoring Report.*

Figure 1, SVE/AS Treatment Cells, *Construction Completion Report for the Soil Vapor Extraction / Air Sparging System*, ENVIRON, November 2006.

Figure 3, *Construction Completion Report for the Soil Vapor Extraction / Air Sparging System*, ENVIRON, November 2006.

Figure 1, Total VOC Concentration – Cell 1 Blower Discharge, Quarterly OMM&C Progress Report No. 10, ENVIRON, September 29, 2008.

Notice in Post Tribune, September 7, 2008.

Update 6 to the Midco II Administrative Record.

Table 3-1, Parameter-Specific Cleanup-Up Action Levels and Associated Parameters, *2005 Annual Monitoring Report*

List of Acronyms

AS air sparging

AWQC: Ambient Water Quality Criteria

cm/sec: centimeters per second (a unit for hydraulic conductivity)

Consent Decree: Consent Decree for Civil Action No. H 79-556, United States of America vs Midwest Solvent Recovery, Inc., et al. (Defendants); American Can Company, Inc., et al. (Third Party Defendants); vs Accutronics, et al. (Third Party Defendants), which was filed in the United States District Court in Hammond, Indiana on July 23, 1992.

CR : cumulative, incremental lifetime cancer risk

ENVIRON: ENVIRON International Corporation, a consultant for the MRC from June 2000 to the present

EPA: United States Environmental Protection Agency

ERM: Environmental Resources Management, a consultant for the MRC from approximately 1987 to September 2002

ESD: Explanation of Significant Differences (EPA document to describe and explain changes to the ROD that do not require an amendment)

ESD#1 Explanation of Significant Differences dated 1 / 9 / 96 (EPA document to change MAC and GWCAL for 1,1-dichloroethane)

ESD#2 Explanation of Significant Differences dated 11 / 2 / 99 to change the MAC and GWCALs for certain polyaromatic hydrocarbons

ESD#3 Explanation of Significant Differences dated 9/30/04 primarily to change soil cleanup components

GC gas chromatograph

gpm gallons per minute

GWCALs groundwater cleanup action levels (these are concentrations of contaminants required to be achieved at the end of the groundwater cleanup)

HBLs Health Based Levels used to evaluate requests to delist hazardous wastes under the Resource Conservation and Recovery Act (for groundwater HBLs were set

	equal to the MCL or to the more stringent of CR = 10^{-6} or HI =1.0 for residential water usage if an MCL was not available)
HI	cumulative incremental non-carcinogenic hazard index
ICs:	institutional controls
IDEM	Indiana Department of Environmental Management
InDOT	Indiana Department of Transportation
IRIS	EPA's Integrated Risk Information System.
LEL	Lower explosive limit
MACs	maximum allowable concentrations (the treated groundwater must be less than these concentrations before being deep well injected)
MCLs	Primary Maximum Contaminant Levels for drinking water from 40 CFR 121
mg/kg	milligrams per kilogram, a unit for contaminant concentration in soil, equal to parts per million
mg/l	milligrams per liter, a unit for contaminant concentration in groundwater, equal to parts per million
MRC	Midco Remedial Corporation (a corporation formed by the Settling Defendants to the Midco I and Midco II Consent Decree for the purpose of implementing the requirements of the Consent Decree)
NSA	non-source area wells
OMMCP	*Operation, Maintenance, Monitoring, and Closure Plan*, ENVIRON, November 2006.
O&M	operation and maintenance
pounds/hr	pounds per hour
psi	pounds per square inch (a unit for compressive strength)
PAHs	Polyaromatic hydrocarbons
PCBs	Polychlorinated biphenyls

PID	Photoionization detector
PRG	EPA, Region 9's preliminary remediation goals
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision (EPA's official decision document). Unless otherwise noted, this refers to the 1989 ROD.
RPM	EPA Remedial Project Manager
SA	source area wells
scfm	cubic feet per minute and standard temperature and pressure
sediment/ soil CALs	sediment/soil cleanup action levels (required to be achieved in soil below sediments that are excavated)
SOW	Statement of Work, Appendix I to the Midco I and Midco II Consent Decree
S/S	solidification/stabilization
SVE	soil vapor extraction
SVOCs	semivolatile organic compounds
TWSLs	EPA Region 3 tap water screening levels
ug/l	micrograms per liter, a unit used to express the concentration of contaminants in groundwater and is equal to parts per billion in water
ug/m^3	micrograms per cubic meter, a unit used to express concentration of contaminants in air
UIC	EPA, Region 5's Underground Injection Control Branch
VOCs	volatile organic compounds
Weston	Weston Solutions, Inc., EPA's oversight contractor

Executive Summary

The selected remedy for this industrial disposal site includes: access restrictions; deed restrictions; excavation of contaminated sediments and underlying soils from the ditch north of Midco II to achieve soil/sediment cleanup action levels (CALs), and consolidation of the excavated soil/sediments onto the source area; groundwater pump-and-treat and disposal via deep well injection to achieve the groundwater cleanup action levels (GWCALs); soil and groundwater treatment by soil vapor extraction / air sparging (SVE/AS) to achieve at least a 97% reduction in volatile organic compounds (VOCs); excavation or solidification/stabilization of high metals and cyanide contaminated soils; and a site cover over the source area. The remedial actions are being implemented under a Consent Decree by a group of Settling Defendants, who have formed the Midco Remedial Corporation (MRC) to implement the remedy. The U.S. Environmental Protection Agency and the Indiana Department of Environmental Management are overseeing implementation of the remedy.

In 1993, the MRC partially excavated contaminated sediments and soil from the ditch, but contamination remains in the sediments and soils left in place. In 1994, the MRC constructed a pipeline along the ditch to bypass the area of contaminated sediments and soils, and the site fence was extended to enclose those areas to restrict human access. Also in 1993, the MRC filed deed restrictions on some of the properties. In 1994 and 1995, the MRC constructed the pump-and-treat, and deep well injection system, which has been in operation since 1996. In 2003 – 2005, the MRC constructed the SVE/AS system, which has been in operation since March 2006. In addition to continued operation and maintenance (O&M) and monitoring of the pump-and-treat and deep well injection system, and the SVE/AS system, the following active remedy components have not been completed: excavation of the high metals and cyanide contaminated soil, construction of the final site cover; and actions to address the remaining sediment area contamination.

The access restrictions, groundwater pump-and-treat and deep well injection, and a portion of the SVE/AS system are functioning as intended in the ROD, including complying with air emission limitations and deep well injection requirements. The pump-and-treat system is adequately containing the contaminated groundwater, and there have been reductions in the concentrations of most groundwater contaminants. The SVE/AS system has been successful in removing a large quantity of VOCs from the source area soils and groundwater, and in reducing groundwater contamination in areas where AS has been effectively operated. In other areas, the AS has not been effectively operated, and groundwater in these areas still exceeds the GWCALs. For that reason, the SVE/AS must be repaired and effectively operated in these areas. Although there are deed restrictions on some properties, the deed language and other institutional controls (ICs) need to be updated, fully implemented, and monitored.

The toxicity factors and exposure assumptions for evaluating air emissions, and the treatment requirements prior to deep well injection are protective. During design of the final site cover, the final actions for the contaminated soil / sediments remaining in the ditch will be decided and the soil/sediment CALs may also need to be updated. When shut-down of the pump-and-treat is requested, the GWCALs may need to be updated.

The remedy protects human health and the environment in the short term because:

- Fencing, deed restrictions on some properties, and on-site staff prevent human exposure to the contaminated groundwater, soils and sediments (a City of Gary Ordinance also prohibits residential usage of groundwater);
- Although wildlife can be exposed to the contaminants remaining in the sediment areas, the area affected is small, the value of the habitat is minor, and the contaminant concentrations may not exceed background; and
- Monitoring is being performed to assure that the SVE/AS emissions comply with air emission limitations, and the regenerative thermal oxidizer is being maintained to treat the air emissions, if necessary.

In order for the remedy to be protective in the long-term, the following actions are needed:

- Continued restriction of access;
- Continued O&M and monitoring of the pump-and-treat system to contain the contaminated groundwater and attempt to achieve the GWCALs (Operable Unit #1);
- Repair and continued O&M and monitoring of the SVE/AS system to effectively treat all areas where the contaminated groundwater exceeds the GWCALs (Operable Unit #2);
- Addition of fluoride to the groundwater monitoring;
- Excavation of high metals and cyanide contamination (Operable Unit #2);
- Consideration, and if necessary, evaluation of ecological risks and adjustment of the soil/sediment CALs during design of the site cover and final sediment excavation;
- completion of sediment excavation;
- installation of the final site cover (Operable Unit #3);
- update the GWCALs; and
- full implemention and monitoring of ICs.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name ***(from WasteLAN)***: Midco II		
EPA ID ***(from WasteLAN)***: IND980679559		
Region: 5	**State:** IN	**City/County:** Gary / Lake

SITE STATUS	
NPL status: X Final ☐ Deleted ☐ Other (specify)	
Remediation status (choose all that apply): X Under Construction X Operating ☐ Complete	
Multiple OUs?* X YES ☐ NO	**Construction completion date:** NA ___ / ___ / _____
Has site been put into reuse? ☐ YES X NO	

REVIEW STATUS	
Lead agency: X EPA ☐ State ☐ Tribe ☐ Other Federal Agency ________________	
Author name: Richard Boice	
Author title: Environmental Engineer	**Author affiliation:** U.S. EPA
Review period:** _5_ / _17 / _2004_ to _1_ / ___ / _2009_	
Date(s) of site inspection: ___ / ___ / _____	
Type of review: X Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion	
Review number: ☐ 1 (first) ☐ 2 (second) X 3 (third) ☐ Other (specify) ________	
Triggering action: ☐ Actual RA Onsite Construction at OU #____ ☐Actual RA Start at OU#____ ☐ Construction Completion X Previous Five-Year Review Report ☐ Other (specify)	
Triggering action date ***(from WasteLAN)***: _5_ / _17 / _2004_	
Due date ***(five years after triggering action date)***: _5 / _17 / _2009_	

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues:

1. Fluoride is not being monitored in the groundwater, but is likely to exceed its GWCAL, and the fluoride contamination may be from Midco II;
2. Contamination from off-site may make it impossible for the pump-and-treat system to achieve all GWCALs;
3. GWCALs may not be protective;
4. SVE/AS has not been performed in Cell 2, Cell 4, and eastern portion of Cell 3, where some VOCs significantly exceed GWCALs;
5. Sediments and soils in the ditch exceed CALs;
6. Sediment / soil CALs may not be protective; and
7. IC work is not complete.

Recommendations and Follow-up Actions:

Issue 1: Add fluoride to the groundwater monitoring parameter list.
Issues 2 and 3: Evaluate and update GWCALs at the time of review of request to shut-down pump-and-treat;
Issue 4: Repair SVE/AS for Cells 2 and 4, and re-initiate treatment.
Issue 5 and 6: Evaluate whether to cover or excavate the sediments, and update of soil/ sediment CALs during review of design for site cover.
Issue 7: Perform additional IC evaluation, as needed; file updated restrictive covenants for all necessary properties; work with the City of Gary to assure notification of non-potable groundwater usage near Midco II; and add IC monitoring to the O&M plan. **Protectiveness Statement(s):**

The remedy protects human health and the environment in the short term because:
- Fencing, deed restrictions on some properties, and on-site staff prevent human exposure to the contaminated groundwater, soils and sediments (a City of Gary ordinance also prohibits residential usage of groundwater);
- Although wildlife can be exposed to the contaminants remaining in the sediment areas, the area affected is small; the value of the habitat is minor, and the contaminant concentrations may not exceed background; - Monitoring is being performed to assure compliance with air emission limitations, and the regenerative thermal oxidizer is being maintained to treat the air emissions, if necessary.

In order for the remedy to be protective in the long-term, the following actions are needed:
- Continued restriction of access;
- Continued O&M, and monitoring of the pump-and-treat system to contain the contaminated groundwater and attempt to achieve the GWCALs (Operable Unit 1);
- Repair and continued O&M and monitoring of the SVE/AS system to effectively treat all areas where the contaminated groundwater exceeds the GWALs (Operable Unit 2);
- Addition of fluoride to the groundwater monitoring;
- Excavation of high metals and cyanide contamination (Operable Unit 2);
- Consideration, and if necessary, evaluation of ecological risks and adjustment of the soil/sediment CALs during design of the site cover and final sediment excavation;
- Completion of sediment excavation;
- Installation of the final site cover (Operable Unit 3);
- Update the GWCALs; and
- Full implemention and monitoring of ICs.

Comments: None.

Date of last Regional review of Human Exposure Indicator (from WasteLAN): __9/28/2006_____
Human Exposure Survey Status (from WasteLAN): _current human exposure under control_____
Date of last Regional review of Groundwater Migration Indicator (from WasteLAN): __6/12/2007
Groundwater Migration Survey Status (from WasteLAN): _contaminated groundwater under control
Ready for Reuse Determination Status (from WasteLAN): __NO___________________________

Five-Year Review Report

I. Introduction

This report presents the methods, findings, conclusions, and recommendations of the third five-year review for the Midco II site located in Gary, Indiana. The purpose of this review is to evaluate implementation and performance of the remedial actions in order to determine whether or not the remedy is or will be protective of human health and the environment. The remedial action for the Site is expected to result in hazardous substances remaining above concentrations that would limit use and restrict exposure at the end of the remedial action. Therefore, a five-year review is required by statute.[a] This report was prepared by Region 5 of the U. S. Environmental Protection Agency (EPA). This five-year review relied upon reports and evaluations performed by the following parties:

- ENVIRON International Corporation (ENVIRON), a consultant for the Midco Remedial Corporation (MRC) from June 2000 through the present;
- Weston Solutions, Inc. (Weston), EPA's oversight contractor from 1985 through 2006;
- Indiana Department of Environmental Management (IDEM); and
- Subsurface Construction Corporation, Houston, Texas (for the underground injection well testing).

The following parties reviewed and provided comments on this report: ENVIRON; IDEM; LFR Inc., another consultant working for the MRC; the EPA Region 5, Underground Injection Control Branch (UIC); and the MRC, which represents a group of companies responsible for performance of the cleanup pursuant to the 1992 Consent Decree with EPA and IDEM.

Work specifically on the third five-year review was initiated by the EPA Remedial Project Manager (RPM) on September 8, 2008, but oversight of the remedial actions (which has included construction and operation of a soil vapor extraction and air sparging system (SVE/AS), and operation of a pump-and-treat / deep well injection system) and evaluation of performance has been an ongoing process over the last five years. This oversight and evaluation has included periodic on-site inspections; and review of reports on design, O&M, and monitoring. This five-year review was officially completed on the signature date of this report. This report will be placed in the Midco II Administrative Record file located at EPA's office at 77 W. Jackson Boulevard, Chicago, Illinois, and in the local document repository, which is located in the City of Gary Public Library.

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[a] Section 121(c) of the Comprehensive Environmental Response Compensation and Liability Act, 42 U.S.C. § 9621 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and Section 300.430(f)(4)(ii) of the National Contingency Plan, require periodic review (at least once every five years) for sites where hazardous substances, pollutants or contaminants will remain above levels that would allow unlimited use and unrestricted exposure after completion of the remedial action.

II. Site Chronology

The following Table 1 provides a chronology of past events, and Table 2 provides the future schedule. See previous five-year review reports for a more detailed chronology of past events.

Table 1: Chronology of Past Events Midco II

EVENTS THROUGH REMEDY SELECTION	DATES
Midco II site used for industrial waste storage, recycling, and disposal	1976 – 1977
EPA installed a fence around the site	1981
EPA removed all surface wastes (including thousands of drums, a number of tanks and excavated and removed sludge pit and filter bed)	1982 – 1989
EPA placed Midco II on the National Priorities List	6 / 10 / 86
Settling Defendants conducted Remedial Investigation/Feasibility Study (RI/FS)	1985-1989
EPA issued Record of Decision (ROD)	6 / 30 / 89
EPA issued ROD Amendment	4 / 13 / 92
EPA, the State of Indiana and Settling Defendants entered into an agreement on the final remedial actions in a Consent Decree. The generator Settling Defendants formed the MRC to carry out the remedial actions.	6 / 23 / 92
EVENTS FOR IMPLEMENTATION OF GROUNDWATER REMEDY	
MRC designed, constructed and tested the groundwater pump-and-treat / deep well injection system	1992 – 1996
MRC operated pump-and-treat / deep well injection system	2 / 96 -present
EPA approved Five-Year Underground Injection Well Re-Application Package	5 / 7 / 98
EPA issued first *Five-Year Review Report*	10 / 29 / 98
MRC constructed an expansion to pump-and-treat system to improve groundwater capture	10 / 02– 2 / 03
EPA issued *Second Five-Year Review Report*	5 /17/ 04
EPA approved the second underground injection re-application	6 / 28 / 06

EVENTS FOR IMPLEMENTATION OF SOIL REMEDY	
MRC and EPA performed solidification/stabilization (S/S) treatability studies	1992 – 1/97
MRC performed partial sediment excavation and on-site containment	9 / 93 –8 / 94
MRC planned and performed treatability testing for chemical oxidation	2000 – 2001
MRC performed additional investigations, evaluation of alternatives	2002
EPA issued Explanation of Significant Differences #3 (ESD#3), which included: performance of AS in conjunction with SVE; reduction of soil solidification/stabilization requirements; and addition of the option of excavation as an alternative to soil solidification/stabilization.	9 / 30 / 04
MRC designed the SVE/AS system	2003 – 2005
MRC constructed and tested SVE/AS system	10 / 03- 1 / 06
MRC operated SVE/AS system	2/06–present
EPA approved conditional shut-down of thermal oxidizer	May 3, 2007

Table 2: Future Schedule Midco II

MRC will repair SVE/AS and update ICs	2009
MRC will continue to operate SVE/AS	Present – 2010
MRC will excavate high metals and cyanide contaminated soil and dispose off-site (or treat by S/S), evaluate soil/sediment CALs as necessary, complete *soil/sediment excavation, construct final site cover, and submit a request to shut-*down the pump-and-treat system	2011
MRC will submit updated underground injection Well reapplication	12 / 28 / 13
MRC will continue to operate the pump-and-treat, and monitor groundwater and ICs	Present - Undetermined

III. Background

Physical Characteristics

The Midco II source area occupies approximately seven acres of sandy soil and fill located at 5900 Industrial Highway, Gary, Indiana, but the fence has been extended on the northeast side to enclose a few more acres to include areas of contaminated groundwater and ditch sediments. Man has extensively modified the original ridge and swale topography. The Midco II source area was filled in with industrial wastes to create a relatively flat surface during the 1950s and 1960s. Further east and north of the site, remnants of some of the original ridge and swale topography are present. The ditch bordering the northeast boundary of the site drains into the Grand Calumet River approximately 2 miles southeast of Midco II (see attached Figure 1, Site Location Map, and Figure 2, Well and Piezometer Locations).

Midco II is 1.14 miles south of Lake Michigan and 0.85 miles north of the Grand Calumet River. The only aquifer of concern at Midco II is the Calumet aquifer, whose water table is approximately 8 feet below the surface. The Calumet aquifer is 45 to 50 feet thick at Midco II and is underlain by approximately 62 feet of soft silty clay and silty clay loam, and 6 feet of hard silty till. If no action was taken, the Midco II contaminated groundwater could eventually vent to the Grand Calumet River.

Land and Resource Use

Midco II is in a predominantly industrial area where 34 other potential hazardous waste sites have been identified. Midco II is bordered by a former auto salvage yard on the northwest, a ditch and railroad right-of-way on the northeast, vacant filled-in land now owned by the Gary-Chicago Airport Development Zone on the southeast, and Industrial Highway on the southwest. The Gary/Chicago International Airport is located on the southwest side of Industrial Highway across from Midco II. There are a few residential homes near the corner of Clark Street and Industrial Highway, about 1 mile southeast of Midco II. The Gary/Chicago International Airport Authority have plans to use the Midco II property as part of an expanded airport, either as part of the airport itself or as a support facility.

The Calumet aquifer is little used because the predominant source of residential and industrial water in the Midco II area is Lake Michigan. In an Ordinance dated September 20, 2007, the City of Gary prohibited use of water from the Calumet aquifer as a potable water source.

History of Contamination

Waste operations at Midco II were initiated during the summer of 1976. Operations included temporary bulk liquid and drum storage of waste and reclaimable materials, neutralization of acids and caustics, and on-site disposal of liquids via dumping into pits, which allowed seepage of liquids into groundwater and into the ditch. One of these pits, called the "filter bed", had an overflow pipe leading into the ditch. By April 1977, it was estimated that 12,000 to 15,000 55-gallon drums of waste materials were stored on-site. In addition, there were 10 above and below ground storage tanks used to store liquid wastes. On August 15, 1977, a major fire at Midco II destroyed equipment, buildings, and damaged or burned out an estimated 50,000 to 60,000 drums.

Initial Response

Early Court actions to require cleanup actions by the owner/operators were ineffective. In August 1981, EPA installed a 10-foot high fence around Midco II. In two separate removal actions in 1984 and 1985, EPA removed all of the drums, tanks, and surface wastes. Also in 1985, EPA excavated contaminated soil and material from the sludge pit and filter bed, which were highly contaminated by polychlorinated biphenyls (PCBs) and cyanide. The sludge pit and filter bed contents were temporarily contained on-site at Midco II, and were removed and disposed off-site, in a number of removal actions conducted between 1985 and 1989.

Midco II was placed on the National Priorities List in October 1984. Shortly after EPA initiated the RI/FS, EPA reached a settlement with a group of potential generators to conduct the RI/FS and reimburse EPA costs. The group of generators conducted the RI/FS from 1985 through 1989. After the completion of the public comment period on the Proposed Plan, EPA issued the Record of Decision (ROD), in June 1989.

Basis for Taking Action

The RI included evaluation of the hydrogeology, and extensive sampling of groundwater, source area subsurface soil, and surface sediments in surrounding wetlands. The RI demonstrated that the source area soil and the groundwater near the site were highly contaminated. The groundwater results exceeded the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) for the following contaminants:

benzene	arsenic	bis(2-ethylhexyl)phthalate
1,1-dichloroethylene	barium	
1,2-dichloropropane	beryllium	
ethylbenzene	cadmium	
methylene chloride	chromium	
tetrachloroethylene	cyanide	
toluene	lead	
trans-1,2-dichloroethylene	mercury	
1,1,1-trichloroethane	silver	
trichloroethylene	selenium	
vinyl chloride	thallium	
xylene	copper	

Other contaminants of concern included:

acetone	aluminum	chlordane
bis(2-chloroethyl)ether	antimony	cresol
2-butanone	iron	1,4-dichlorophenol
chloroform	nickel	di-n-butylphthalate
1,1-dichloroethane	zinc	n-nitrosodiphenylamine
4-methyl-2-pentanone	vanadium	2,4-dimethylphenol
1,1,2-trichloroethane	manganese	isophorone
1,2-dichlorobenzene	PCBs	pentachlorophenol
butylbenzyl phthalate	phenol	

polyaromatic hyrdocarbons (PAHs)

An unanticipated finding was that the aquifer in the vicinity of Midco II is highly saline, primarily due to sodium and potassium chlorides. Chloride is as high as 60,000 milligrams per liter (mg/l) in groundwater below the site. It has been theorized that most of the high salinity was caused by fill containing secondary aluminum smelting waste, although it appears that disposal of wastes in the filter bed also contributes to the salinity.

IV. Remedial Actions

Remedy Selection

Remedial Objectives: The remedial objectives used to select the remedial action in the 1989 ROD as revised by the 1992 ROD Amendment and three ESDs included:

- Eliminate direct contact threat from contaminated source area soil and sediments;
- Treat the principal threat in soil to substantially reduce the threat of groundwater contamination and the direct contact threat;
- Prevent off-site migration of contamination in groundwater;
- Assure that contaminants do not adversely affect biota;
- Cleanup groundwater.

ROD Requirements: The 1989 ROD as amended by the 1992 ROD Amendment and revised by ESD#3, provides for the following remedy components:

- Excavation of contaminated sediments and underlying soils in defined wetland areas to achieve the soil/sediment CALs, and consolidation onto Midco II;
- Construction, O&M, and monitoring of a groundwater pump-and-treat system to contain contaminated groundwater, and to achieve the groundwater cleanup action levels (GWCALs);
- Construction and operation of a deep underground injection well for disposal of the contaminated groundwater following treatment;
- Construction and operation of an SVE/AS system to cleanup source area soils and groundwater, including achieving at least a 97% reduction of VOCs in soil;
- Excavation or solidification/stabilization of the soil most highly contaminated by metals and cyanide;
- Construction of a final cover, access restrictions, deed restrictions, and monitoring.

Table 3 provides a summary of the cleanup performance requirements applying to each of these remedy components, and the source of those requirements.

Table 3: Cleanup and Performance Requirements for Midco II

Component	Applicability	Requirements (source)
Access	Site access	Six foot chain link fence with 3-strand barbed wire around site, and warning signs (1989 ROD)
Restrictive Covenants	Property transactions	Remedy component (1989 ROD); specific deed language (1992 Consent Decree, updated by a recent EPA letter)
Sediment and soil excavation	Excavation in defined sediment areas is required until CALs are met	CR = 10^{-6}; HI = 1.0;[b] and lead = 500 milligrams per kilogram (mg/kg) (ROD Amendment)
Groundwater pump-and-treat	Extent of groundwater capture	All portions of the Calumet aquifer affected by Midco II that exceed the GWCALs (ROD Amendment)
	Pump-and-treat must continue until the GWCALs are achieved unless it is determined to be technically impracticable	GWCALs: MCLs; CR = 10^{-5}; HI = 1.0; and Ambient Water Quality Criteria (AWQC) X 3.6[c] (ROD Amendment)
Deep well	The deep well must be located, constructed, tested, monitored and operated to meet these requirements	Requirements for Class I, non-hazardous injections wells identified in 40 CFR 144 Subparts A, B, D, and E, and 146 Subparts A, B, and F (*Statement of Work* [SOW], ROD Amendment)
	The extracted groundwater must be less than these concentrations before being injected injection	Maximum Allowable Concentrations (MACs): 6.3 times the Health Based Levels (HBLs) used for Resource Conservation and Recovery Act (RCRA) delisting demonstrations in July 1991 (ROD Amendment as updated by ESD#1 and ESD#2)[d]
SVE/AS	Volume of soil where SVE must be performed	An estimated 79,200 cubic yards of source area soils above and below water table (ESD#3)

[b] The CR (cumulative lifetime incremental cancer risk) and HI (non-cancer hazard index) are calculated using exposure assumptions and toxicity factors defined in the ROD Am, including assuming a hypothetical lifetime residential exposure to soils having the sampling point concentrations.

[c] The CR and HI are calculated using exposure assumptions and toxicity factors defined in the ROD Am, including assuming a hypothetical lifetime residential exposure to water having the sampling point concentrations. AWQC are listed in the ROD Am. MCLs are automatically added to the GWCALs when they are promulgated.

[d] By not exceeding the MACs the groundwater meets the equivalent of RCRA delisting requirements and is considered non-hazardous pursuant to RCRA.

Component	Applicability	Requirements (source)
SVE	Must be achieved in soil following completion of SVE	97% reduction in VOCs in treated soils (1992 ROD Amendment) based on before and after soil gas sampling (*Final Design Report,* ENVIRON, April 2005)
Excavation or S/S	Remove or treat soils most highly contaminated by metals and cyanide	A number of defined grid areas totaling 1,000 cubic yards unless post treatment sampling results demonstrates that it no longer is considered a principal threat (ESD#3)
On-site storage and off-site treatment/disposal	Sampling and treatment residuals, and excavated soils that may contain hazardous wastes	RCRA, 40 CFR 260 - 268 EPA's Off-site Rule, 40 CFR 300.440
S/S	Where S/S is performed instead of excavation, must be achieved in material treated by S/S	Metals≥90-99% reduction in mobility except 500 micrograms per liter (ug/l) for copper[e]; cyanide 40 ug/l; hydraulic conductivity ≤ 10^{-7} cm/sec; unconfined compressive strength ≥ 50 pounds per square inch (psi); wet-dry durability ≤ 10% weight loss; freeze-thaw durability ≤10% weight loss (ROD Amendment as modified in ESD#3)
Air emissions	The CR and HI limitations apply to potential human exposures for each remedy component separately; the pound per hour and fugitive dust limitations apply to all remedy components operating at the same time	CR = 1 X 10^{-7}; HI = 1.0;[f] 3 pounds/hr of VOCs (Clean Air Act definition); Indiana Administrative Code 6-4 for fugitive dust (ROD Amendment)
Final cover	Areal extent of cover Construction requirements	Cover entire source area (ROD Amendment) A multilayer cover; RCRA Subtitle C landfill closure requirements (ROD Amendment)

Remedy Implementation

<u>Quality Assurance and Monitoring:</u> In accordance with Consent Decree requirements, all sampling data for the remedial design and remedial action work have been generated in accordance with procedures in an EPA-approved Quality Assurance Project Plan (QAPP). The *Second Five-Year Review Report* explains how the number of groundwater monitoring parameters was reduced to the present list of about 180

[e] The reduction in mobility is measured by comparing before and after treatment results of the Synthetic Precipitation Leaching procedure (SW-846, Method 1312).

[f] The toxicity factors and some exposure assumptions for calculation of CR and HI are defined in the ROD Am.

parameters. This list and the project specific quantitation limits are presented on the attached Table 1-1 from the *2005 Ground Water Monitoring Report.* This same list of parameters is monitored for the deep well injection with the following exceptions: fluoride is added; and sulfide and hexavalent chromium are not monitored.

Fluoride was not analyzed during the RI and was not expected to be a significant problem in groundwater at Midco II. However, fluoride has been detected at from 1.73 to 13.1 mg/l in the quarterly influent samples, and generally exceeded the fluoride MCL (4 mg/l) from 1993 through 2006. Concentrations appear to be decreasing versus time, and in 2007 – 2008 detections ranged from 2.32 to 2.81 mg/l. These detections in the Midco II influent indicate that fluoride is likely to be a significant contaminant in Midco II groundwater. Therefore, fluoride needs to be added to the groundwater monitoring parameter list in order to evaluate whether it exceeds its GWCAL and whether the contamination is likely to be from Midco II.

The applicable EPA approved QAPP is the *Remedial Design / Remedial Action Quality Assurance Project Plan* dated May 14, 1993, as updated. During the last five years, the QAPP has been updated as follows:

- Revised soil gas sampling and analysis procedures in Appendix H of the *Final Design Build Report (Revision 3) Soil Vapor Extraction / Air Sparging Midco II Superfund Site,* ENVIRON, April 2005, and in letters from ENVIRON dated October 7, 2005 and November 14, 2007; and
- Updated low flow groundwater sampling standard operating procedure in accordance with procedures e-mailed to EPA on June 13, 2005.

The QAPP as updated provides for 100% data validation for ambient air, air emission, and baseline and confirmation soil gas sampling, and for 10% validation of the groundwater data, with follow-up validation of the rest of the data set if a significant problem is identified in the 10% sample. The MRC procured an independent contractor to perform the data validations. The RPM routinely reviews the validation reports. Both the Weston and EPA staff were impressed with the high quality of the data validations received from the MRC's data validation contractor. As a result, although the Weston oversight contract included provisions for Weston to audit the data validation reports by checking the validation report against the raw data packages, EPA decided that this was not necessary.

EPA, IDEM, and Weston have routinely monitored data usage through review of ENVIRON's monthly progress reports, annual groundwater monitoring reports, capture zone evaluations, the baseline soil gas sampling report, quarterly and annual reports on the SVE/AS, and interim soil gas sampling reports. The UIC has reviewed the deep well injection reapplication packages and reports on deep well testing.

Weston, IDEM, and EPA staff have overseen the annual groundwater sampling, some influent and effluent sampling, and some SVE and soil gas monitoring events (see Table 4, EPA, Weston, and IDEM Inspections of Midco II from April 2004 – December

2008, at the end of this report). UIC oversees testing of the deep injection well. During field inspections, EPA identified that ENVIRON was collecting soil gas samples after the sampling pump instead of before the pump as provided for in the approved plan. In response to this, ENVIRON revised the soil gas sampling procedure in a letter dated November 14, 2007.

During the last five years, the MRC has constructed the SVE/AS system at Midco II. EPA has overseen the quality of construction by reviewing and approving design documents, by field oversight of the construction and a pre-final inspection (see Table 4), and by review of the *Construction Completion Report for the Soil Vapor Extraction/Air Sparging System*. Weston, under contract with EPA, provided support to EPA in review of design documents and the *Construction Completion Report*. IDEM also participated in this review. Appendix F of the *Final Design/Build Report* includes the Construction Quality Assurance Plan, which defined procedures to be implemented to assure that the construction meets the specifications. ENVIRON's construction quality assurance data are summarized in the *Construction Completion Report*. Weston provided EPA with daily oversight of subsurface construction work, which included installation of the horizontal SVE wells, the AS wells, and monitoring wells for soil gas, pressure, and water levels. Weston also provided periodic oversight of other construction. EPA, Weston, and IDEM staff participated in the pre-final inspections.

EPA, with support from Weston and IDEM, has overseen O&M of the pump-and-treat / deep well injection system and the SVE/AS system through periodic on-site inspections (see Table 4) and review of related documents including: the OMMCP; revisions to the health and safety plans; monthly progress reports; and quarterly and annual reports on SVE/AS.

<u>Health and Safety:</u> Contractors for the MRC have prepared health and safety plans, which have been reviewed by EPA and Weston. The following Health and Safety Plans cover remedial design and remedial action activities:

- *Remedial Design/Remedial Action Health and Safety Plan,* Environmental Resources Management (ERM), May 14, 1993;
- *Construction Health and Safety Plan*, ERM August 1994;
- *Operating and Maintenance Health and Safety Plan*, ERM, November 1996;
- Task Specific Health and Safety Plan Addendum for SVE/AS System Construction and Operation; ENVIRON; August 2005 (attached to the *Final Design/Build Report*);
- Letter re: Modification of Exclusion Zones, ENVIRON, October 14, 2005.

Health and safety procedures were supplemented in an e-mail from ENVIRON dated July 22, 2005 to provide for a temporary support zone to provide relief to workers in the heat of the summer.

Air monitoring using photoionization detector (PID) and hydrogen cyanide detectors was performed continuously near the source areas and in the breathing zone during the following operations: trenching and installation of the horizontal SVE wells; and advancement of augers for the AS and monitoring wells. Use of respirators was required during installation of six of the horizontal SVE wells. Operations had to be shut-down several times during installation of the AS and monitoring wells until PID levels dissipated.

IDEM, EPA, and Weston inspections have included review of health and safety procedures. During an inspection of installation of the temporary vapor barrier installation at Midco I in May 2004, Weston noted the following health and safety concerns: the Health and Safety Plan was not present on-site; required personal protective equipment was not being worn when Weston arrived; and significant dust was being generated by truck traffic. ENVIRON quickly addressed these concerns.

<u>Air Emissions:</u> During design of the SVE system, ENVIRON predicted air emission rates and performed ambient air modeling. Based on this, ENVIRON determined that a thermal oxidizer was needed to comply with air emission criteria. During startup testing of each SVE cell, Summa canister samples were collected from the inlet and outlet of the regenerative thermal oxidizer. Using these results, ENVIRON confirmed that the air emissions would comply with the criteria after treatment by the regenerative thermal oxidizer. During O&M, Summa canisters samples were collected from the inlet and outlet from the regenerative thermal oxidizer three times during the four week commissioning period, and have been collected monthly thereafter. Sets of ambient air samples (one upwind and three downwind) were collected three times during installation of the horizontal SVE wells, once during start-up, three times during the four week commissioning period, and once per month during the first four months of operation.

ENVIRON has produced quarterly reports on the SVE O&M and monitoring. Each of these reports included any ambient air data collected, air emission data and an assessment of compliance with the air emission criteria. Because the ambient air samples did not identify any significant VOC detections, EPA approved discontinuation of the ambient air sampling in a July 10, 2006 letter after the first four months of operation. Each quarterly report demonstrated that the SVE system was in compliance with the air emission criteria. On May 3, 2007, EPA approved shut-down of the thermal oxidizer because VOC emissions were consistently below the air emission criteria in samples from the inlet to the regenerative thermal oxidizer, subject to restart if PID readings exceed 50 parts per million for one hour. ENVIRON restarted the regenerative thermal oxidizer on January 9, 2008, when the AS rates were increased, and operated it until July 23, 2008.

Following inspection of SVE system on March 30, 2006, Weston expressed concern about detection of hydrogen cyanide in soil gas in SVE wells and advised that further monitoring should be performed. In an April 7, 2006 letter, ENVIRON responded that *no further monitoring for hydrogen cyanide is necessary for the following reasons:*

hydrogen cyanide has been monitored in the breathing zone for health and safety reasons using portable meters, and has not been detected; and hydrogen cyanide is highly combustible and any hydrogen cyanide from the soil gas will be destroyed in the thermal oxidizer prior to emission. Therefore, EPA did not require addition of air emission monitoring for hydrogen cyanide.

On-site Storage and Off-site Disposal: In the 1989 ROD, EPA determined that the following listed hazardous waste as defined in RCRA regulations had been disposed on-site: F001; F002; F003; F005; F007; F008; and F009. For this reason, any residuals from treatment of groundwater (including spent pre-treatment filters) or soil, must be handled and disposed of as a RCRA hazardous waste unless testing is conducted to demonstrate that the waste is not hazardous under RCRA. In 1999 EPA determined that spent pre-treatment filters could not be disposed under the site cover (January 14, 1999 conversation record), and that spent post-treatment filters qualify as debris and are regulated by 40 CFR 268.45 (December 21, 1998 memorandum).

On-site storage was inspected once by staff from IDEM's RCRA program, and periodically by IDEM, EPA, and Weston staff. Contaminated soil from drill cuttings from installation of wells in areas where off-site disposal of soil is required and solids from well development, were placed in drums for on-site storage. Spent filters from the wastewater treatment were wrapped in plastic bags, and stored under a tarp in 20 cubic yard roll-off boxes. Solids from the clarifier system are bagged after going through a filter press, and then stored in tarped 20 cubic yard roll-off boxes. IDEM's RCRA inspection identified violations because some containers holding hazardous wastes were not properly labeled and because there was not hazardous waste contingency plan. ENVIRON corrected these violations.

In response to a request from EPA, in March 2006, ENVIRON started including copies of hazardous waste manifests in the monthly progress reports, which are required under the Consent Decree. For the period from May 2004 through March 2006, ENVIRON provided a copy of the hazardous waste manifests with a letter dated April 7, 2006. Based on data in the manifests, the following off-site disposal occurred between May 2004 and December 2008:

- From May 2004 through January 2005, 96 cubic yards of waste filter cake were disposed off-site at C.I.D., Calumet City, Illinois.
- In May 2005, 110 gallons of soil/water separator sludge was disposed at Onyx Environmental Services, Port Arthur, Texas.
- In December 2005, 2,500 pounds of waste activated carbon (used to control air emissions during the pilot testing of the SVE) was transported off-site for reactivation treatment / disposal at Envirotrol in Darlington, Pennsylvania.
- In December 2005, 800 pounds of contaminated soil cuttings (from installation of AS and monitoring wells in grid areas where off-site disposal is required pursuant to ESD#3) and in March 2006 contaminated soil cuttings with free liquids (from

development of AS wells) were transported to the Michigan Disposal Waste Treatment Plant, Belleville, Michigan for treatment / disposal;
- 435 cubic yards of spent filters were transported off-site for disposal at the Michigan Disposal Waste Treatment Plant; and
- 164 tons of bulk filter cake were transported off-site for disposal at Wayne Disposal, Inc., Site No. 2 Landfill, Belleville, Michigan.

To assure compliance with EPA's Off-site Rule, in February 2006, EPA confirmed that the Michigan Disposal Waste Treatment Plant and CID were in compliance with federal and state environmental regulations. In an April 7, 2006 letter, ENVIRON committed to regularly contacting EPA to assure that the disposal facilities being used are in compliance with environmental regulations.

Some wastes are being treated or contained on-site. Drill cuttings outside of the grids requiring excavation and off-site disposal were placed under the temporary vapor barrier (see Figure 3). Waste water from sampling, well development, and condensate from SVE piping, was collected into a tank or barrel, and gradually fed into the groundwater treatment system where it is filtered, treated by the UV/HP unit and then pumped through the underground pipeline to the deep well.

Pipeline breaches occurred in November and in December 2004 and resulted in the release of approximately 820 gallons of treated Midco II groundwater. These releases were reported to IDEM, who assigned Incident Numbers 2004-11-128 and 2004-01-004. No cleanup of these releases was required. Available data indicates that contaminants in Midco II effluent samples were below the MCLs.

<u>Excavation of Sediment Areas to achieve Soil / Sediment CALs:</u> The contaminated sediments and soils in the ditch north of Midco II were partially excavated in 1993. The unexcavated soil/sediments did not achieve the soil/sediment CALs. Furthermore, a screening of ecological risks indicates that contaminants in the unexcavated soil/sediments could cause severe effects on invertebrates. As an interim measure, EPA approved leaving the contaminated soil/sediments in place enclosed within a fence and diverting the ditch drainage around the contaminated soil/sediments until design of the final site cover (see attached Figure 2). ESD#3 eliminated the requirement that the contaminated sediments be treated by S/S. In 2005 as part of the SVE construction, the sediments that had been consolidated on Midco II and stored under a plastic liner, were spread and then covered by the temporary vapor barrier and the overlying clean soil. These excavated sediments are now included in the SVE treatment area, and will be contained under the final cover.

During design of the final site cover, EPA will require consideration of human health and ecological risks from the unexcavated soil/sediments. Options to address these soil/sediments include: covering the contaminated sediment areas with clean soils; conducting further excavation and containing the excavated soil under the site cover; and leaving contaminated soil in place.

Pipeline to Midco I: After the Midco II groundwater is treated to meet the MACs, it is pumped through an underground pipe for approximately three miles to the Midco I site. At the Midco I site, the Midco I and Midco II treated groundwater flows are combined and pumped to the deep well, which is located on property adjacent to Midco I. The pipeline is pressure tested annually, and is automatically shutdown if the pipeline pressure exceeds 50 psi. A number of shut-downs occurred due to high pipeline pressures. Actions taken in response to these shut-downs included: treating the pipeline with bleach, surging the pipeline, removal of obstructions, and fixing the Midco I pipeline control valve.

Pipeline flow is also monitored and totalized continuously at the Midco I and Midco II sites. The totalized flows are electronically compared every 4 hours, and an automatic shut-down occurs if the difference exceeds 1%. During the last five years, the following events triggered shut-downs in response to the differential flows:

- In June 2004, it was found that low pipeline flow rates (from maintenance of sand filters and clarifier) resulted in air pockets, which triggered the flow differential.
- On November 15, 2004, an environmental consultant performing excavations to investigate an adjacent property cut through the pipeline. The system shut-down properly in response to the differential flow, and was down for approximately seven days, while repairs and pressure testing were performed.
- On December 31, 2004, an excavating contractor accidentally cut through the pipeline while investigating an adjacent property. The system shut-down properly in response to the differential flow, and was down for approximately five days, while repairs and pressure testing were performed.
- On September 28, 2006, it was found that this was a false alarm.

Deep Well Injection System: During the last five years, ENVIRON has complied with all technical requirements for O&M of the deep well, including monitoring and reporting requirements. The deep injection well is screened in the lower Mount Simon aquifer, which is not a drinking water aquifer, because the total dissolved solids exceed 10,000 mg/l. Deep well monitoring and testing requirements include: continuous monitoring and recording of injection pressure, flow rate, and annulus pressure to assure that an annulus pressure of at least 100 psi more than the injection pressure is maintained; daily recording of a fluid level corresponding to the annulus fluid pressure; monthly analysis of the fluid being injected; annual internal mechanical integrity tests; and five-year external mechanical integrity tests. Both the annual and five-year mechanical integrity tests were repeated during September 29 and 30, 2008 and are now under review by UIC.

A comprehensive description of the existing deep well and EPA's requirements relative to its design, location, and O&M, are in the underground injection well permit applications/reapplications. Review of these application/reapplications is primarily the responsibility of the UIC. EPA approved the most recent reapplication (*Permit Re-*

Application Class I Non-Hazardous Injection Well, Midco I and II Superfund Sites, Subsurface Technology, Inc., September 2005) on June 28, 2006. The next reapplication is due on or before December 28, 2013.

ENVIRON has implemented actions to improve operation of the deep well. In general during the last five years, the automatic acid injection has eliminated the need for periodic shut-downs for well rehabilitation to control biological growth. In May 2004, the deep well was shut-down for approximately 17 hours because of a PVC pipe crack. In response to this, ENVIRON replaced the PVC pipe with steel pipe. Because of relatively high injection pressures, on December 5 and 12, 2007, flow from Midco II was turned-off to allow the low pH flow from Midco I to clean the deep well, and bleach was also added. On April 28, 2008, an EPA inspector observed that the steel piping in the deep well building was highly corroded. In an August 26, 2008 inspection, it was observed that the steel pipe had been replaced. According to ENVIRON, the steel piping had been replaced with high pressure polyethylene piping.

<u>O&M of the Groundwater Pump-and-Treat System:</u> Continuous operation of the Midco II pump-and-treat system was initiated in December 1996. The project plan for O&M of the groundwater pump-and-treat system is: *Ground Water Remediation Systems Operation and Maintenance Plan*, ERM, August 1994, November 1996, as updated by a number of documents listed in the *Second Five-Year Review Report.* During the last five years, the system components have included: seven groundwater extraction wells; a metals removal system (coagulation, sedimentation, sand filtration, and filter press to dewater sediments); prefiltration using cartridge filters; UV/HP unit; and post treatment filtration using cartridge filters prior to piping the treated groundwater through an underground pipeline to Midco I.

ENVIRON provides data and a summary of the groundwater pump-and-treat O&M and monitoring to EPA in monthly progress reports. During the last five years, O&M of the pump-and-treat system has been acceptable. The Midco II treatment system requires frequent maintenance – typically there are ten or more shut-downs each month for maintenance and repairs. There have been periodic shut-downs to replace the pre-treatment and post-treatment filters, for power failures, and for the following categories of maintenance chores and repairs: metals removal system; UV/HP equipment and electrical; UV/HP lamps; pumps; air compressor; deep well equipment; filtration equipment; computer problems; and high pipeline pressure.

<u>Groundwater Treatment and Monitoring to Meet the MACs, and Influent Trends:</u> The *Investigation and Monitoring Plan* (ERM, 1993) provides for the following monitoring for compliance with MACs:

- Every three months, sampling the treatment system influent for the comprehensive list of 180 groundwater monitoring parameters plus fluoride;
- Sampling the effluent annually for the comprehensive list of groundwater monitoring parameters;
- Monthly sampling of the effluent for surrogate contaminants; and

- Hourly sampling for an indicator parameter.

The monthly surrogates are VOCs and PAHs, which are analyzed at an off-site laboratory. Until May 2007, the indicator parameter was vinyl chloride from a field gas chromatogram (GC), which collected samples every hour. The pump-and-treat system automatically shut-down, if the GC detected vinyl chloride exceeding its MAC. Use of the GC made it easier to make minor adjustments to the system because grab samples of the effluent for off-site analysis of VOCs were not required. In 2004 and May 2007, there were problems with automatic shut-downs due to GC peak shifting during hot weather. With EPA approval, use of the field GC was discontinued in June 2007 because of the maintenance expense, false detection problem, and the long history of compliance with the MACs.

During the last five years, there were three detections exceeding MACs in the monthly effluent samples:

- In August 2004, bromodichloromethane (MAC = 1.89) was detected at 2.2 ug/l in the effluent sample (no action needed to be taken because it was not detected in the combined Midco I/Midco II effluent).
- In February 2005, cis-1,3-dichloropropene was detected at 2.0 ug/l in the effluent sample (no action needed to be taken because it was detected at 1.2 ug/l in the combined Midco I/Midco II effluent).
- In March 2007, cis-1,3-dichloropropene was detected at 1.3 ug/l in the combined Midco I and Midco II effluent (no action was taken because it was detected at 1.2 ug/l in the Midco II effluent).

From the influent and groundwater data, it appears that the detections of bromodichloromethane and cis-1,3-dichloropropene are sporadic and unlikely to increase. Dibromochloromethane has only been detected in Midco II groundwater once (0.11 ug/l in 1998). Cis-1,3-dichloropropane was been detected in a few samples in 2005, 2004, and 2000 at a maximum concentration of 1 ug/l.

Although the MACs only apply to the effluent, review of the influent data indicates which contaminants require treatment, and comparison of the influent to the effluent data can indicate whether the contaminants are being treated. Apparently, vinyl chloride is the contaminant that most requires treatment, but has been effectively treated. From June 2004 through December 2008, vinyl chloride was detected exceeding its MAC in eleven of the nineteen quarterly influent samples at as high as 33 ug/l with no apparent decrease in concentration. However, vinyl chloride was consistently reduced to below the MAC (12.6 ug/l) in the effluent. The only other detections exceeding MACs in the quarterly influent samples were: 1.9 ug/l of 1,2-dibromo-3-chloropropane (MAC = 1.26) in September 2004; 1.3 ug/l of cis-1,2-dichloropropene (MAC = 1.26) in March 2005; and 52 ug/l of bis(2-ethylhexyl)phthalate (MAC = 18.9) in September 2008. The effluent data corresponding to these quarterly samples indicated that these compounds were reduced below the MACs.

Although there is no requirement to treat contaminants that exceeded MCLs, it is noted that the quarterly influent/effluent sampling data indicate that in general the treatment system has reduced concentrations of benzene, cis-1,2-dichloroethene, trichloroethene, and vinyl chloride to below the MCLs. The annual influent/effluent sampling data indicate that the treatment system is reducing concentrations of arsenic to below the MCL in the effluent. The data also indicates that the treatment system is reducing chloroethane, trans-1,2-dichloroethene, ethylbenzene, tetrachloroethene, toluene, xylene, iron, and cyanide concentrations. The treatment appears to have little effect on fluoride (which has exceeded its MCL in influent and effluent samples); 1,1-dichloroethane; or 1,1,1-trichloroethane.[g]

Groundwater Capture Zone Evaluation: The ROD requires that all portions of the Calumet aquifer affected by the Site or by Midco II operations that exceed the GWCALs must be recovered by the pump-and-treat system. The *Second Five-Year Review Report* includes an explanation of how EPA determined the following: the current target capture zone (see Figure II-6, Capture Zone Analysis); that EW-7 needed to be added; and that pumping rates totaling 50.6 gallons per minute (gpm) were needed to achieve the target capture zone (EW1 = 10, EW2 = 10, EW3 = 13, EW4 = 8.1, EW6 = 4.4, EW7 = 9.1). This has been the target pumping distribution since February 24, 2003. Maintenance of groundwater capture has been evaluated by monitoring pumping rates (reported in the monthly progress reports), by periodic water level surveys, and by periodically sampling for off-site contaminant migration. During the past five years, the groundwater pumping rate and hydraulic data have not always provided assurance of adequate groundwater capture, but the water quality data has indicated that contaminants are not migrating off-site. 95% of the target pumping rates was not achieved during two months in 2004, five months in 2005, four months in 2006, 6 months in 2007, and four months in 2008.[h] The primary reasons for not achieving the target pumping rate included: maintenance, power outages, and vandalism.

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g It should be emphasized that from December 2003 through September 2008, influent and effluent concentrations of fluoride; 1,1-dichloroethane; and 1,1,1-trichloroethane have been well below the concentration requiring treatment prior to deep well injection: 1.64 to 5.60 mg/L for fluoride (MAC = 25.2 mg/L); 11 to 63 ug/L for 1,1-dichloroethane (MAC = 880 ug/L); and not-detected to 32 ug/L for 1,1,1-trichloroethane (MAC = 1,260 ug/L).

h Months in which less than 95% of the target pumping rate was achieved include: June 2004 -- 44.8% primarily because of warranty maintenance on the sand filters and clarifiers; November 2004 -- 69.3% primarily because of breach of the Midco II pipeline; January 2005 -- 84.4% primarily because of another breach in the Midco II pipeline; June 2005 -- 84.1% primarily because of power failures and other routine maintenance; November -- 94.6%, October -- 69.7% and September 2005 -- 89.3% primarily because of reduced capacity of a backup deep well pump, which was operated during replacement of primary deep well pump; January -- 68.9% and February 2006 -- 37.7% primarily because of shut-down for clarifier repair; March 2006 (74.7%) primarily because of various maintenance problems; October 2006 -- 77.5% because of shut-downs for power outages, deep well mechanical integrity and pipeline pressure tests, and various maintenance problems; February 2007 -- 81% because of more than usual maintenance shut-downs; June 2007 -- 90.4% because of shut-downs from power failures and vandalism, and shut-

Water levels were collected in June 2005, and interpreted using a groundwater model. The model shows that the target capture zone was achieved at a total pumping rate of only 45.2 gpm, which is 89% of the target rate (see attached Figure II-6, Capture Zone Analysis).

On June 22, 2007, dewatering using eight pumping wells began for construction of a new hanger approximately 200-300 feet south of Midco II and 100 feet south of the Q monitoring well cluster on the Gary-Chicago International Airport property. ENVIRON staff noticed this activity, and on June 26 began daily monitoring of water levels in a select set of wells. After a few days, this monitoring indicated that the dewatering was causing drawdown as far away as the southern end of Midco II. By July 3, the construction contractor had constructed an infiltration trench between the dewatering wells and Midco II. Operation of the infiltration trench solved the problem by reversing groundwater flow back towards Midco II.

ENVIRON performed additional water level surveys on October 19, 2007; March 7, 2008; May 1, 2008; and August 13, 2008. The data leaves some uncertainty as to whether there is adequate groundwater capture at the southern end of Midco II because the water level at Q-10 is generally lower than at H-10 and V-10 (see attached Groundwater Contour Map – 8/13/08, ENVIRON). Data from March 7 and May 1, 2008 monitoring events appear to indicate that groundwater in the northern half of Midco II was flowing off-site to the east. According to ENVIRON, the loss of capture in the northern part of Midco II resulted from reduced pumping from extraction wells in that area. This is confirmed in the monthly progress report for May 2007, in which the total flow rate exceeded the design target by 12%, but flow rates were less than design from pumping wells in the northern part of Midco II. ENVIRON suspected that the pumping problems were a result of well plugging by iron precipitation and biological growth induced by the AS operation. ENVIRON increased well cleaning efforts to remedy the problems. Later ENVIRON reported that the pumping problems were caused by air bubbles from the AS interfering with the pumps. This problem was corrected by turning off certain AS wells. The August 13, 2008 data shows that the groundwater in the northern part of Midco II was being captured (see attached Groundwater Contour Map), when the total pumping rate exceeded the design target rate by 11%, and by approximately 100% at EW6 in the northern part of Midco II.

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downs for optimization of the clarifier system; July 2007 -- 91.7% because of more than usual shut-downs for optimization of the clarifier system; August 2007 -- 59.1% because of shut-downs from power failures and more than usual shut-downs for maintenance; October 2007 -- 88.1% primarily because of shut-down for the annual deep well mechanical integrity test; December 2007 -- 85.8% primarily because of shut-downs for power outages, and for treating the deep well; June 2008 --44.2% primarily because of shut-downs caused by power outages and replacement of damaged electrical components; September 2008 – 85.1% primarily because of the annual shutdown for the mechanical integrity test; November 2008 – 66% primarily because of deep injection well flow meter problems; and December 2008 – 65% primarily because of a power failure, deep injection well flow meter problems, clarifier maintenance.

In spite of periods of reduced pumping, the uncertainty about hydraulic capture based on potentiometric surface maps, and impacts of off-site pumping, EPA has concluded that groundwater capture has been adequate for the following reasons: natural groundwater contaminant movement at Midco II is relatively slow because of the low hydraulic gradients, and groundwater contaminants were not detected in off-site monitoring wells.

Groundwater Cleanup: ENVIRON has reported that through December 2008, about 214 million gallons of groundwater has been pumped and treated at Midco II, and 111 million gallons since April 2004. Using influent data and flow rates, ENVIRON estimated that the pump-and-treat system has removed 3,106 pounds of VOCs through March 2008, and that 843 pounds were removed between September 2004 and March 2008. From December 5, 2007 to March 12, 2008, an estimated 95 pounds of VOCs were removed, which averages a removal rate of approximately 1.0 pound/day.

ENVIRON collected a round of annual groundwater samples (40 to 41 monitoring wells/piezometers and the six extraction wells) in May and June 2004, June 2005, June 2007, and June 2008. All of the samples were analyzed for VOCs, metals, cyanide, and sulfide. Selected samples were analyzed for hexavalent chromium. The 2004 samples were analyzed for the full 180 parameter list (plus sulfide), including direct injection VOCs, semivolatile organic compounds (SVOCs), PAHs, PCBs, chlorinated pesticides, organophosphorous pesticides, and herbicides. In 2008, ENVIRON also analyzed PCBs at C10, where PCBs has previously been detected in groundwater, and at E10R. In addition, ENVIRON has collected quarterly groundwater samples from about nine monitoring wells starting in October 2006 to monitor the progress of treatment by AS. These include the monitoring wells where the groundwater is most highly contaminated (F10, R10, and MW4D), and wells to monitor for contaminant movement from these highly contaminated areas (MW50, D10, R50, T10, and T50). See attached Figure 2 for the location of groundwater monitoring wells/piezometers.

The attached Table 5-2 from the *2004 Annual Ground Water Monitoring Report,* and Table 5-2 from the *2008 Annual Ground Water Monitoring Report* summarize the contaminants that exceeded or contributed to exceeding a GWCAL. The data shows a significant reduction in the number of wells where GWCALs were exceeded.

Between 2004 and 2008, the number of wells where VOCs exceeded or significantly contributed to exceeding a GWCAL was reduced from 21 source area wells (SA) and non-source area wells (NSA) to twelve SA, including EW1, EW2, EW3, EW7, D10, D30, F10, F30, MW-1, MW4D, R10 and R50. Wells where groundwater no longer exceeds GWCALs for VOCs include: E10R (which was formerly one of the most highly contaminated locations); G10, G30, P10, T50, U10, V10, EW4, and EW6. The maximum detections in 2004 and 2008 for VOCs that exceeded GWCALs are summarized below and generally indicate a reduction in VOC concentrations.

Table 5: Comparison 2004 and 2008 Maximum Detections of VOCs that Exceeded GWCALs and Locations of those Detections (conc. in ug/l, detections exceeding GWCALs are bolded)

VOC	2004 MAX. DETECTION	2004 LOCATION	2008 MAX. DETECTION	2008 LOCATION
acetone	5,800	EW7	3,500	R10
2-butanone	12,000	MW4D	2,800	MW4D
4-methyl-1-pentanone	3,700	F10	1,000	MW4D
benzene	110	R10	56	D10
ethylbenzene	13,000	R10	1,600	R10
toluene	43,000	R10	5,300	R10
xylene	39,000	R10	4,700	R10
cis-1,2-dichloroethene	2,800	R10	200	R10
1,1-dichloroethene	77	EW3	19	EW3
1,2-dichloropropane	34	F10	3.4	EW3
methylene chloride	830	MW4D	50	F30
tetrachloroethene	190	R10	1.9	MW1
trichloroethene	20	E10R	19	MW1
vinyl chloride	40	EW3	83	EW3

Three attached figures show the VOC trends in groundwater at three of the most highly contaminated SA monitoring wells (E10, F10, and R10). All three figures show reductions in VOC concentrations that could be related to operation of the AS, which started in March 2006. It appears that the VOC concentration decrease at F10 occurred mostly after January 2008, apparently as a result of enhancement of the AS in the northern part of Midco II. Except for methylene chloride, GWCALs for VOCs were achieved at F10 in June 2008. After it was observed that VOC concentrations were not dropping at R10, it was found that the AS well closest to R10 was not being operated because it caused ejection of groundwater from R10 and R50. To address this situation, ENVIRON inserted packers in R10 and R50, and operated all of the AS wells near R10 to the maximum. The most recent data appears to indicate that VOC concentrations at R10 are decreasing.

In 2008, VOCs exceeded GWCALs at D10 and D30, which are near the western boundary of Midco II and are slightly outside of the AS treatment area. There appears to have been little or no decreasing trend in VOCs at D10 or D30 since 1993. D10 and D30 are outside of the SVE/AS treatment area, and groundwater at these wells could be affected by contamination from the adjacent property, where VOCs were detected in groundwater during the RI.

The groundwater data indicates that further AS is needed to reduce VOC concentrations in locations where AS treatment has not been effectively performed (see

Figure 1, SVE/AS Treatment Cells for Cell locations). The following table summarizes 2008 VOC detections in groundwater in Cell 2, the eastern portion of Cell 3, and Cell 4 that exceeded GWCALs. Because very little AS has been performed, and VOC concentrations significantly exceed GWCALs, AS for Cell 2, Cell 4 and the eastern portion of Cell 3 needs to be repaired and operated.

Table 6: Summary of VOC Detections Exceeding GWCALs in Cell 2, the Eastern Portion of Cell 3, and Cell 4 (Concentrations in ug/l)

CELL	WELL	VOC	CONC.	GWCAL
2	EW3	1,2-dichloroethane	2.2	1
		1,1-dichloroethylene	19	1
		cis-1,2-dichlorylene	180	70
		1,1,2-trichloroethane	1.9	1.37
		vinyl chloride	83	2.2
3 (east)	MW4D	methylene chloride	32	5
		2-butanone	2,800	588
		Acetone	3,500	3,240
3 (east)	EW7	methylene chloride	18	5
		2-butanone	2,000	588
		Acetone	3,500	3,240
4	EW1	1,2-dichloroethane	1.2	1
		1,1-dichloroethylene	3.1	1
		trichloroethylene	23	5
		vinyl chloride	38	2.2
4	EW2	benzene	8.8	2.69
		cis-1,2-dichloroethylene	190	70
		vinyl chloride	46	2.2
4	MW1	Trichloroethylene	19	5

The decrease in iron concentrations shown in attached Figure 15 from the *2008 Annual Ground Water Monitoring Report* shows that the AS, which started in February 2006, has had an impact on the groundwater geochemistry. It is possible that precipitation of iron will reduce concentrations of other metals, and more oxidizing conditions will oxidize sulfide and cyanide, and enhance biodegradation of organic compounds. Future monitoring should observe this impact.

Table 6 below compares the number of detections of inorganic contaminants exceeding GWCALs, including significantly contributing to exceeding the CR or HI in 2004 and 2008, and compares detections in SA, and NSA. The total detections include data from monitoring wells, piezometers, and extraction wells. Table 7 compares the maximum detections in 2004 and 2008. The data appears to indicate the following: a significant reduction in the number of detections exceeding GWCALs for arsenic, barium, sulfide, iron, and chromium; a significant decrease (≥ 50% reduction) in the maximum detections for cyanide, sulfide, chromium, copper, selenium, and manganese; and an increase in the number of detections and concentrations of antimony and thallium.

These tables also indicate that there is an off-site or background component for arsenic, barium, sulfide, iron, and thallium contamination (NSA are outside the area where Midco

II hazardous waste disposal is known to have occurred, and migration of contaminated groundwater to the NSA appears to have been limited because historical VOC detections were low). The antimony, manganese and selenium contamination appears to be focused off-site.

Note that according to the 2008 monitoring well data, metal and sulfide detections exceeding the GWCALs were predominantly in the deep part of the aquifer (13/19 for sulfide, 5/7 for iron, 12/15 for arsenic, 5/5 for barium, and 5/5 for thallium), but the cyanide contamination exceeding the GWCALs appears to be concentrated in the shallow part of the groundwater.

Table 7: Comparison of 2004 and 2008 Detections of Inorganic Contaminants Exceeding GWCALS in Source Area and Non-source Area Wells

CONTAMINANT (GWCAL in ug/l)	2004 SA DETECTIONS ≥ GWCAL	2004 NSA DETECTIONS ≥ GWCAL	2008 SA DETECTIONS ≥ GWCAL	2008 NSA DETECTIONS ≥ GWCAL
arsenic (15.1)	20	15	11	7
barium (1,000)	6	3	5	0
cyanide (158)	1	0	1	0
sulfide (12.6)	23	18	14	7
iron (15,300)	4	11	2	5
nickel (350)	1	0	2	0
mercury (0.25)	1	0	1	0
Chromium III (100)	2	0	0	0
copper (120)	1	0	1	0
Selenium (50)	0	1	0	0
manganese (2,500)	0	1	0	1
antimony (6)	0	0	0	1
thallium (3)	0	0	2	3

Table 8: Comparison 2004 and 2008 Maximum Detections of Inorganic Contaminants and Locations of those Detections

CONTAMINANT	2004 MAX. DETECTION (ug/l)	2004 LOCATION	2008 MAX. DETECTION (ug/l)	2008 LOCATION
Arsenic	122	MW4D (SA)	89.8	N50 (NSA)
Barium	7,520	MW50 (SA)	6,770	MW50 (SA)
Cyanide	537	MW1 (SA)	211	MW1 (SA)
Sulfide	66,000	D10 (SA)	31,400	C10 (SA)
Iron	52,700	EW6 (SA)	58,700	EW1 (SA)
Nickel	778	MW4D (SA)	1,329	EW6(SA)
Mercury	0.26	MW4D (SA)	0.4	R10 (SA)
Chromium	513	H30 (SA)	25	G30 (SA)
Copper	478	G10 (SA)	231	G10 (SA)
Selenium	63.6	S10 (NSA)	37.6	S10 (NSA)
Manganese	4,570	MW3S (NSA)	2,750	U10 (NSA)
Antimony	3	V50 (NSA), C30 (SA)	10.7	S10 (NSA)
Thallium	ND		13.5	MW50 (SA)

Fluoride is not a groundwater monitoring parameter but was generally detected exceeding its MCL (4 mg/l), from 1993 through 2006 in the quarterly influent samples. Detections ranged from 13.1 to 1.73 mg/l and generally appear to be decreasing with time. In 2007 and 2008, detections have ranged from 2.32 to 2.81 mg/l.

As previously noted, the following parameter groups were analyzed in 2004, but not in 2005, 2007, or 2008: direct injection VOCs; SVOCs; PAHs; PCBs (except for analyses at C10 and E10 in 2008); organochlorine pesticides; organophosphorous pesticides; and herbicides. In 2004, there were no detections of direct injection VOCs, organophosphorus pesticides, or herbicides. There were trace SVOC and organochlorine pesticide detections, but none significantly contributed to exceeding a GWCAL.

PCB detections appear to have decreased. In 1996, PCBs were detected exceeding the MCL and CR at D10 and C10 with a maximum concentration of 160 ug/l at C10. In 2004, PCBs were detected at C10, MW50, and EW6 with a maximum detection of 3.6 ug/l at C10. In 2008, PCBs were not detected at C10.

Carcinogenic PAHs do not appear to have decreased. In 1996, PAHs were detected exceeding the CR at C10, E10, and R10 with a maximum cumulative concentration of 27.8 ug/l at C10. In 2004, carcinogenic PAHs exceeded the CR at C10, E10 and EW6 with a maximum concentration of 89.9 ug/l at EW6.

<u>Soil Treatment:</u> Conceptual design information on the SVE/AS system was included in *Soil Treatment Design/Build Alternative Remedy Revision 1 Midco I and Midco II Superfund Sites*, ENVIRON, July 2003. In October and November 2003, the first three horizontal SVE wells, five AS wells, and nine accompanying air sparge and vapor monitoring points were installed for use in pilot testing. The final design was approved in the *Final Design/Build Report*, ENVIRON, April 2005, as supplemented by later more detailed design documents. The final layout of the SVE/AS system is shown on the attached Figures 1 and 3 from the *Construction Completion Report for the Soil Vapor Extraction/Air Sparging System*, ENVIRON, November 2006. Figure 1 shows how the SVE/AS system is divided into four cells.

In October through December 2004, clearing, grubbing, grading, road construction and installation of the 22 remaining horizontal SVE wells was performed. The horizontal SVE wells were installed at 50 to 60 foot spacings, and consist of six-inch diameter, continuously screened, schedule 40 PVC piping. Trenches for the horizontal wells were from 5 to 5.5 feet below ground surface. The SVE wells were installed with the first lift of stone, and were backfilled with clean washed stone.

In March through May 2005, the temporary vapor barrier was installed consisting of a layer of non-woven geotextile underlying a layer of 12 mil scrim-reinforced polyethylene. The temporary vapor barrier was generally sloped to promote run-off, but some hummocks remained. Twelve inches of clean soil was placed over the polyethylene.

In June through October 2005, the 56 remaining AS wells were installed at approximately 30 foot spacings, along with the accompanying air sparge, soil gas, and pressure monitoring wells. Special procedures were followed to prevent contact with contaminated soils and to seal the temporary vapor barrier around these wells. Each AS well was constructed of 2-inch diameter, schedule 40 PVC pipe, screened from 40-45 feet below ground surface with a five foot, 0.01-inch slot PVC well screen. The air sparge monitoring wells consist of 2-inch PVC pipe, and a two foot, 0.02-inch slot PVC well screen, placed across the top 2 feet of the water table at the time of installation. The pressure and vapor monitoring wells consist of 1-inch PVC pipe, and a three foot PVC well screen. The bottom of the well screen was placed between the water table and 6 inches below the water table at the time of installation. Evidence of free product was observed at a number of locations during installation of the AS and monitoring wells, and a monitoring well was installed at one of the locations. ENVIRON observed that no free product was recoverable from that well.

The baseline soil gas measurements, which will be used for calculation of the % reduction in VOCs, were performed in October 2005. The measured % reductions will be used to monitor for achievement of the 97% reduction performance standard for SVE. The results indicate that portions of Cell 1 and Cell 3 were by far the most highly contaminated by VOCs. The maximum detected total VOCs in soil gas were as follows (in micrograms per cubic meter [ug/m^3]): Cell 1 -- 16,513,000; Cell 2 -- 115,830; Cell 3 – 13,733,000; and Cell 4 – 2,667.

From October 2005 through January 2006, the vacuum blowers, air sparge compressors, piping, blower and compressor sheds, regenerative thermal oxidizer, and electrical and natural gas supplies, and appurtenances were delivered to the site, connected, and start-up testing performed. Piping runs for each horizontal SVE well exit the ground through vertical piping, which connects to an aboveground header, which then connects to a vacuum blower. Heat-traced condensate traps were installed at about 100-foot intervals along the SVE piping. The discharge from each blower is directed via fiberglass-reinforced plastic piping to the regenerative thermal oxidizer. Compressed air from the AS compressors is directed to the vertical AS wells via high density polyethylene piping.

An infrared combustion gas indicator was installed at the inlet to the regenerative thermal oxidizer, and was designed to add dilution air if 10% LEL (lower explosive limit) or greater was detected, and automatically shut-down the system at 25% LEL. The regenerative thermal oxidizer was also equipped with a display of the stack and chamber temperatures, and a chart to constantly record these temperatures.

Special precautions, including addition of dilution air, were followed during start-up to prevent creating an explosive mix of vapors at the regenerative thermal oxidizer. After one week of operation, levels of combustible gases had dropped, and addition of dilution air was no longer necessary. During start-up, each SVE Cell was started up separately, and measurements performed, including: LEL at the blower exit and regenerative thermal oxidizer; VOCs at the cell blower and before and after the thermal oxidizer; PID, air flow, and vacuum in SVE wells; vacuum in vapor monitoring and pressure monitoring points, and water level in the air sparge monitoring points. This data was used to assure that the SVE system would be effective, would operate safely, and in compliance with air emission criteria. After a vacuum was induced at the vapor monitoring points, some of the AS wells were turned on.

The AS wells in Cells 1, 3 and 4 were developed in December 2005 and January 2006 (AS wells in Cell 2 had been developed in 2003). The wells were surged with a surge block and a submersible pump was used to remove loose sediment, which typically included removal of 15 to 30 gallons of groundwater. During start-up, higher than anticipated injection pressures and low flows were observed in a number of AS wells. An inspection indicated that silt had accumulated in the bottom of the AS wells. These wells were redeveloped following start-up.

After continuous operation of the SVE/AS system was initiated in March 2006, a weekly, monthly, and quarterly sampling schedule started, and O&M and monitoring progress reports were submitted quarterly. Starting in October 2006, quarterly groundwater monitoring was performed to track the progress of the groundwater cleanup. According to the *Final Design Report*, the SVE system was designed to remove 1,500 pore volumes per year by pumping approximately 3000 standard cubic feet per minute (scfm): 1,210 cfm from Cell 1; 219 scfm from Cell 2; 995 scfm from Cell 3; and 612 scfm from Cell 4. The SVE system was designed so that one-half of the SVE wells would be subjected to a vacuum while the other half would serve as air inlet wells. The target air injection rate for each AS well was 10 scfm.

The regenerative thermal oxidizer operated continuously with the chamber temperature of 1600°F until November 14, 2006, when the temperature was increased to 1,800°F because of relatively low destruction removal efficiencies during September and October 2006 (89% and 81%). With EPA approval, the regenerative thermal oxidizer was shut-down on May 15, 2007 after it was demonstrated that the inlet to the oxidizer consistently complied with the air emission requirements.

From February 2006 through June 21, 2007 (when the SVE/AS system was shut-down because of vandalism), the SVE/AS system is estimated to have removed 8,600 pounds of VOCs. The removal rate was generally more than one pound/hr until August 2006. From March through May 2007, the removal rate was 0.034 to 0.044 pound/hr. The SVE system operated at about 75% of the design flow rate of 3,050 cfm. The flow was fairly evenly distributed among the operating horizontal SVE wells. In general, pressure and oxygen readings suggested that the target treatment area was being impacted, although many of the pressure and vapor monitoring wells could not be used because their screens were submerged by an elevated water table.

Before the June 2007 vandalism, the AS was under-utilized. In March 2006, 20 of the 65 AS wells were operating at from 1.5 to 8.1 scfm. In July 2006, 26 AS wells were operating at from 0.2 to 6.5 scfm. In August and September 2006, 36 AS wells were operating at from 0.245 to 3.47 scfm (the flow rate from about nine of the AS wells could not be measured). The AS system was completely turned-off in October and December 2006 - April 2007 apparently because with the high groundwater table AS was inducing flooding of the SVE wells. From April until June 21, 2007, only two to four AS wells were operated, both in Cell 1.

The SVE/AS system was vandalized during the night of June 21, 2007. The SVE/AS system shut-down and could not be readily restarted because of extensive damage to the electrical system (wire casings were broken open and the wiring pulled out to steal the copper, and damage occurred from the resulting electrical surges). The MRC decided to perform limited soil gas sampling before repairing the SVE/AS system. The limited soil gas sampling occurred on July 30 and 31, 2007. VOCs in soil gas remained at relatively high concentrations especially in Cells 1 and 3 (see table below). In addition, the quarterly groundwater monitoring results indicated that very high VOC concentrations in groundwater remained at least at monitoring well MW4D in Cell 3, and in F10 and R10 in Cell 1. The MRC proposed repairing the electrical wiring only for Cells 1 and 3, and concentrating SVE/AS on Cells 1 and the western half of Cell 3. EPA agreed with proceeding with SVE/AS only in Cells 1 and the western half of Cell 3 at that time because these areas appeared to be the most highly contaminated, but identified the following concerns: very little AS had been performed in Cells 2 and 4, or in the eastern part of Cell 3; soil gas data indicated that further SVE was needed to achieve a 97% reduction in Cells 2 and 4; and groundwater data indicated that further AS was needed to achieve the GWCALs in Cell 4.

The MRC reconstructed the SVE/AS electrical system for Cells 1 and 3 in November and December 2007. The MRC reinitiated operation of the SVE on December 17, 2007, and of the AS on January 9, 2008. The Cell 1 and 3 SVE flow rates were similar to the rates before the shut-down. From February through July 2008, the SVE/AS operated as follows: instead of operating alternative horizontal SVE wells, all except for one of the horizontal SVE wells in Cell 1 were operated (but the total air flow rate remained about the same), and four of the horizontal SVE wells on the western half of Cell 3 were operated; and approximately twenty-four AS wells in Cells 1 and 3 were targeted for operation. Because it was anticipated that VOC emissions could increase from enhanced AS, the regenerative thermal oxidizer was turned on when the AS was reinitiated on January 9, 2008 and operated until July 23, 2008.

ENVIRON and LFR worked deliberately to increase the flow rates in the target AS wells to at least 10 scfm. Increasing AS flow rates was hampered by water in the lines, which made it impossible to measure the flow rate to many of the AS wells using an anemometer as had been planned. By September 2008, ENVIRON had installed orifice plates for flow measurement at each of the 24 target AS wells. In October 2008, packers were installed in R10 and R50 to prevent discharge of groundwater induced by the AS, and air flow to AS wells in that vicinity were maximized. The number of AS wells achieving the 10 scfm flow rate (≥ 9.5) increased to 19 in October 2008 after varying from 7 to a maximum of 15 in previous months.

Since re-initiation of the SVE/AS, it is estimated that an additional 4,300 pounds of VOCs have been removed as of October 2008, for a total of 13,000 pounds. The attached Figure 1 from Quarterly OMM&C Progress Report 11 (ENVIRON, December 18, 2008) shows that the total VOC concentrations in the Cell 1 blower discharge increased substantially after restart in January 2008, and that, as of October 2008, VOC concentrations from the Cell 1 blower do not appear to be dropping off – possibly because of improvements to the AS operation. The VOC removal rate increased to as high as 1.4 pounds/hr in February and 1.7 pounds/hour in March 2008. Since then the removal rates have varied from 0.10 to 0.96 pounds/hr with 0.44 pounds/hr removed in October.

The amount of VOC removal is not approaching ENVIRON's estimate of total VOCs in Midco II soil and groundwater (100,000 pounds of organic contaminants, including about 85,000 pounds of VOCs (ignoring the 2X safety factor for tentatively identified compounds), based on soil data from the RI, 2002 trenching data, and 2001 annual groundwater monitoring data, see Tables 4 and 5, *Soil Treatment Design/Build Report Alternative Remedy*).

On August 19 and 20, 2008, ENVIRON collected a limited number of soil gas samples to evaluate the progress of the SVE. The following table summarizes the range of detections and percentage reductions compared to the baseline data, for the August 2008 and July 2007 soil gas samplings.

Table 9: Range of Detections and Percentage Reductions from Soil Gas Sampling on July 2007, and August 2008

CELL	7/07 RANGE OF DETECTIONS (ug/m^3)	7/07 WEIGHTED AVERAGE % REDUCTION	8/08 RANGE OF DETECTIONS (ug/m^3)	8/08 WEIGHTED AVERAGE % REDUCTION
1	63,110 – 8,503,800	59	3,713 – 9,567	100
2	1,289 – 8,313	95		
3	54,530 – 731,000	94	9,931—73,688	99
4	2,359	12		

The total weighted average % reduction using the 8/08 data and the 7/07 data for locations that were not sampled in 8/08, is 99.6%. Based on this data, ENVIRON has concluded that the SVE is approaching the 97% reduction requirement. However, the SVE emission data indicates that a considerable quantity of VOCs are still removable using SVE/AS[i]. In addition, SVE is needed to remove VOCs from the vadose zone soils after they are stripped from the groundwater by the AS.

Excavation of Soils with High Cyanide and Metals Concentrations and Final Site Cover
Design and performance of excavation of soils with high cyanide and metals concentrations and the final site cover is being delayed until completion of the SVE/AS. The design of the final site cover will also address the areas where sediment excavation did not achieve the soil/sediment CALs.

Vapor Intrusion: The distance from Midco II to the nearest structures has provided protection from a vapor intrusion risk. The nearest residence is approximately one mile from Midco II The closest buildings to Midco II include: the Gary/Chicago International Airport terminal, a warehouse, and an office building which are over 500 feet from Midco II.

Institutional Controls (ICs) and Access Restrictions

Presently the Midco II property is being used only for cleanup activities. The 1989 ROD requires access restrictions by construction of a fence around the site, and imposition of deed restrictions. ENVIRON is maintaining a fence around the contaminated soil and sediment areas, and the groundwater treatment facility. The present extent of the Midco II fence is shown in Figure 2. Periodic inspections by EPA and IDEM staff have confirmed that the fence is being adequately maintained. In addition to the fence, access is restricted by ENVIRON personnel, who are present on the site to operate the groundwater treatment system almost every day. These personnel are a deterrent to site entry, and are able to observe evidence of trespassing on the site and initiate corrective measures. In spite of these measures, vandals broke through the fence and illegally entered the site during the night of June 21, 2007. The vandals stole copper wiring, and ended up shutting-down the SVE/AS system and causing more than $50,000 in damage. As a deterrent to further vandalism, when the wiring was repaired, the MRC buried the main conduits and encased conduits into the blower and compressor sheds in steel pipes. No further security measures were implemented. The SVE/AS system has operated since the end of December 2007 without further vandalism.

In June 2007, on-site personnel were successful in identifying off-site pumping that had potential to interfere with the groundwater capture zone. On June 22, a construction company initiated dewatering for construction of a hangar using eight pumping wells approximately 200 to 300 feet south of Midco II. The company was unaware of the Midco II groundwater pumping even though it had obtained an ALTA survey for the construction site, and discussed known environmental issues with Airport staff. After

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i If it is assumed that the average rate of removal over the next two years will be about 0.15 pound/hr (one-third of the October 2008 rate), another 2,600 pounds of VOCs would be removed. This would be 3.6 pounds per day, which exceeds the removal rate using the pump-and-treat system (one pound/day).

being notified of what was happening, the MRC initiated discussions with the construction company and other parties, issued a warning letter, and had ENVIRON initiate water level monitoring. Shortly after being notified that their pumping was causing drawdown at Midco II, the construction company implemented a corrective action (construction of an infiltration trench).

The 1989 ROD and 1992 ROD Amendment include deed restrictions as a component of the remedy. Deed restrictions are one type of IC, which are non-engineered instruments, such as administrative and/or legal controls, that help to reduce the potential for exposure to contamination and protect the integrity of the remedy. In general, compliance with ICs is required to assure long-term protectiveness for any areas which do not allow for unlimited use or unrestricted exposure.

The Consent Decree requires that the Settling Defendants perform the following actions relative to deeds and the land records applying to the property that they own:

- File an EPA-approved notice to subsequent property owners in the land records of Lake County, Indiana that they own part of a facility where hazardous substances were disposed;
- Notify EPA and the State of Indiana prior to transfer of the property, and assure that any deed, title or other instrument of conveyance of the property must contain a notice that the property is subject to the Consent Decree;
- Record a copy of the Consent Decree in the chain of title in the land records of Lake County, Indiana for property that they own; and
- File in the land records a deed/use restriction in the form shown in Appendix 8 of the Consent Decree.

To the extent that property is not owned by the Settling Defendants, the Consent Decree requires them to use their best efforts to cause the owners of such property to implement the deed notices, and restrictions identified above. In 1992 and 1993, the Settling Defendants filed deed restrictions in the land records for some, but not all, of the property within the Midco II site boundaries using the language required in the Consent Decree. In an action outside of the Consent Decree, on September 27, 2007, the City of Gary passed an ordinance prohibiting drilling of new wells to be used as a source of potable water, requiring existing private wells to be connected to the City water system if possible, and requiring non-potable water wells to be registered.

During 2008, EPA performed an initial IC evaluation. EPA determined that the existing access controls along with the City of Gary's groundwater ordinance provide sufficient protection from current public health threats. However, EPA identified the following concerns that may impact the long-term protectiveness of the remedy: deed restrictions required in the Consent Decree are not in place on all properties where contaminants exceed the soil CALs and/or the GWCALs (presently this includes the source area); the existing deed language may not be effective; it is possible for non-potable water usage to draw contaminated groundwater off-site; and existing project plans do not include IC monitoring. Therefore, EPA has determined that the following additional steps must be taken: update deed language for all properties where unrestricted usage or access presents an unacceptable threat to human health or the environment; work with the City of Gary to assure notification of non-potable water usage near Midco II; prepare and implement an IC monitoring plan; and further evaluate and implement ICs, as necessary to enhance the long-term protectiveness of the remedy. EPA is currently in communication with the MRC regarding this issue.

O&M Costs

The MRC has not provided EPA with annual O&M costs. During the last five-years, EPA has cooperated with the MRC in a number of their requests for approval of changes to reduce O&M costs, including:

- Waived annual groundwater monitoring requirements for 2006 and approved discontinuation of ambient air monitoring for the SVE operation in a letter dated July 10, 2006;
- Waived the annual soil gas sampling for 2006 and 2007; and
- Approved shut-down of the regenerative thermal oxidizer for the SVE system in May 2007.

V. Progress Since the Last Review

Following is the protectiveness statement from the *Second Five-Year Review Report:*

In summary, the access / deed restrictions and groundwater remedial actions at Midco II currently protect human health and the environment because contaminated groundwater from Midco II is being contained, because air emission and deep well injection requirements are satisfied, and because direct contact with the contaminated soils and groundwater is being prevented. However in order to assure that the remedy remains protective the following actions need to be implemented:

- *improved notification and reporting of operating and maintenance problems affecting compliance with the MACs;*
- *more comprehensive data validation;*
- *closely observe trends in VOC concentrations along the east boundary of the monitoring well network, and metals in outer monitoring wells, ;*
- *install additional monitoring wells east of the site and better characterize off-site and background contamination, if necessary; and*
- *when evaluating a request for shutdown update the groundwater cleanup action levels if necessary.*

The sediment excavation, soil treatment and site cover phases of the remedy are expected to be protective of human health and the environmental upon completion, and in the interim exposure pathways that could result in unacceptable risks are being controlled.

The following table summarizes the status of the issues identified in the *Second Five-Year Review Report*:

Table 10: Actions Taken Since the Last Five-Year Review

Issues from Previous Review	Recommendations/ Follow-up Actions	Party	Milestone Date	Action Taken and Outcome	Date of Action
1. Data Validation	Follow up on problems identified in 10% of data manually validated	MRC	4 / 8 / 04	EPA sent letter to MRC requiring corrective action. MRC agreed to this change.	4 / 8 / 04
2. Reporting of changes affecting MAC compliance	Notify EPA of changes, and report operating parameters in monthly progress reports	MRC	5 / 6/ 04	EPA sent letter to MRC requiring corrective action. MRC sent letter agreeing to corrective action and started adding additional operating parameters to monthly progress reports.	5 / 6 / 04 5/26/04
3. Off-site contamination	Closely observe trends in boundary wells / better characterize off-site contamination, if necessary	MRC	Ongoing	Data from the 2004, 2005, 2007 and 2008 annual groundwater monitoring have been closely reviewed. VOC detections at D10 and D30 may originate from property west of Midco II. There appears to be an off-site component of arsenic, barium, sulfide, iron, and thallium contamination. Selenium, antimony, and manganese contamination appears to be focused off-site.	Ongoing
4. Soil exceeds soil CALs	Implement soil treatment and final site cover	MRC	Ongoing	SVE/AS soil treatment is being implemented.	Ongoing
5. Eastern extent VOC plume	Closely observe trends in P3, and install additional monitoring wells, if necessary	MRC	Ongoing	No longer a concern based on data from 2004, 2005, and 2008.	Ongoing
6. Delay in soil treatment	Implement SVE/AS	MRC	5 / 6 / 04	EPA sent letter to MRC requiring corrective action. The SVE treatment started in February 2006.	5 / 6 / 04
7. GWCALs	Update GWCALs	EPA	Future	No action to date.	Future
8. Soil CALs	Update soil CALs	EPA	Future	No action to date.	Future

The 1998 *Five-Year Review Report* noted that contaminated sediments and soils exceeding the soil CALs was left in the ditch north of Midco II. The site fence was extended around these sediments, and a bypass pipe was constructed to direct flow in the ditch around the contaminated sediments. The site fence is preventing human contact with these soils, and the ecological risk will be evaluated and addressed during design of the final site cover. Because the soil treatment has not been completed, no progress has been made in further evaluating or addressing the ecological risk from the contaminated sediments and soils that were left in place. The *Addendum to the Five-*

Year Review Report contains the following further explanation of the ecological risks from the soil sediment areas. This explanation is still valid.

> *Midco II has an approximately 7 acre source area and is located in a heavily industrialized and urban area. The property is zoned industrial. Industrial Highway, which fronts the south side of the site is a major truck and traffic route. Sediment excavation is required along approximately 1300 feet of the ditch, which borders the north end of Midco II. The total area of excavation covers a total area of only about 1 acre. The ditch was apparently constructed in conjunction with adjacent railroad tracks, which border the north side of the site. A number of large industrial facilities and areas of relatively undisturbed wetlands lie north of the railroad tracks. The ditch also drains the north end of properties along Industrial Highway, which include a couple of junk yards and a number of closed small manufacturing facilities. The Gary-Chicago Airport lies south of Industrial Highway.*
>
> *Although the elevated levels of arsenic and polyaromatic hydrocarbons remain in the unexcavated sediments, value of this area as an aquatic habitat is very low. EPA took this information (small affected area and small value as a habitat) into account in allowing the MRC to enclose the sediment area with a fence and divert the ditch water around the contaminated sediment area as an interim measure. In addition, it will be less costly and more convenient for the MRC to further address the excavated areas in conjunction with construction of the final site cover than to conduct a special evaluation of the hazard and mobilize to take an action now.*

VI. Five-Year Review Process

Administrative Components

IDEM staff were verbally notified of the initiation of the third five-year review process on August 14, 2008. IDEM, the MRC, ENVIRON and LFR were notified in writing in an EPA letter dated September 8, 2008. On October 2, 2008, the RPM prepared a first draft of the *Third Five-Year Review Report* and distributed it to: Regional Council, Region 5; Stephanie Andrews, IDEM Site Manager; William Bates, UIC; Donald Bruce Chief Region 5 Remedial Response Section #6; Stephanie Linebaugh, EPA Region 5 Five-Year Review Coordinator; and to Sheri Bianchin, IC Coordinator. After obtaining comments on the first draft, a second draft was distributed on December 1, 2008 to the previously listed parties plus: Barbara Coughlin, Ph.D., ENVIRON; William Bow, LFR Inc.; the City of Gary; and the Gary-Chicago Airport Authority for their review.

Community Notification and Involvement

Janet Pope, EPA Community Involvement Coordinator, arranged to have a notification of the Five-Year Review published in the September 7, 2008 edition of the Gary Post-Tribune (attached). EPA received no public comments or inquiries in response to this notification. When the third five-year review is completed, a notification and summary of results will be published in the same newspaper, and the Third *Five-Year Review Report* and other updates to the administrative record will be made available at the Gary Public Library, as well as at EPA Region 5's Records Center.

Since 2002, EPA staff have been in communication with the Federal Aviation Administration, the Gary-Chicago Airport Authority, and other agencies regarding an environmental impact statement for expansion of the airport. Virginia Lazewski of EPA coordinated with the RPM regarding information on and the impact on Midco II. The final environmental impact statement was issued in October 2004. EPA provided comments in a letter dated November 22, 2004.

As part of EPA's Superfund Redevelopment Initiative, from 2002 to October 2006, E^2 Inc., an EPA contractor, performed a reuse assessment for Superfund sites in Gary, Indiana, including Midco II. The purpose of the reuse assessment was to assist the City of Gary with reuse planning. The activities included evaluating site and market conditions, and considering reuse options. Typically, there is a more thorough assessment of reuse options and involvement of the community, but after consideration of the timing, legal, administrative, and technical obstacles plus the low market demand for the Midco II property, the effort did not proceed to that phase. The final report was issued in October 2006.

During installation of the temporary vapor barrier in May and June 2004, ENVIRON worked with representatives of the City of Gary and the Gary-Chicago Airport Authority to address concerns about dirt on Industrial Highway by using a street sweeper, and generation of dust by wetting the ground surface.

In October 2004, EPA sent a copy of the *Second Five-Year Review Report* to the City of Gary, Department of Environment, and to the Chicago-Gary Airport Authority.

On January 5, 2005, EPA issued a notice in the Gary Post-Tribune regarding the changes in the remedy that EPA approved in ESD#3, including the addition of the SVE/AS system, reducing the amount of S/S, and relaxing S/S performance standards. EPA received no public comments on ESD#3. In June 2005, EPA issued a fact sheet describing the final design of the Midco II SVE/AS system. EPA received no comments in response to this fact sheet.

From June through August 2007, there were discussions about the dewatering being performed on the airport property among the staff of the MRC, ENVIRON, LFR, the construction contractor, the construction contractor's consultant, the Gary-Chicago Airport Authority, the City of Gary, the Gary Sanitary District, EPA, and IDEM.

On August 26, 2008, the RPM met with a Hammond Times reporter at the Midco II site, and provided an explanation and tour of the cleanup operations.

On December 1, 2008, EPA sent a copy of the draft *Third Five-Year Review Report* to the City of Gary, Department of Environment, and to the Chicago-Gary Airport Authority.

Document and Data Review

Documents used for preparation of this report are listed in the attached update to the Administrative Record for Midco II. EPA staff also used documents previously added to the Administrative Record, especially: the ROD Amendment;1998 *Five-Year Review Report; Soil Treatment Design/Build Report Alternative Remedy, Revision 1*, Midco I and Midco II Superfund Sites, ENVIRON, July 2003; the *Second Five-Year Review Report;* ESD#3; and correspondence regarding dewatering at the Gary/Chicago International Airport between June 27 and August 23, 2008.

On-site Inspections since Last Five-Year Review

The Midco II site has been periodically inspected since the second five-year review. The results of these inspections are summarized in Table 11 at the end of this report.

Interviews

The RPM is in regular communication with technical staff of ENVIRON, LFR, and IDEM regarding the site O&M and monitoring. During several site inspections, the RPM met with the ENVIRON site operator and discussed operation of the treatment systems.

III. Technical Assessment

Question A: Is the Remedy Functioning as Intended by the Decision Document?

This question needs to be considered separately for the different components of the remedy, as presented below.

<u>For groundwater pump-and-treat, and deep well injection, the answer is YES, but there are concerns</u> : The pump-and-treat / deep well injection system is operating in compliance with all air emission and underground injection well requirements and, in general, has been achieving adequate groundwater capture. Contaminant concentrations have decreased, but reductions in VOCs are mostly from the AS. It appears possible that VOCs are migrating into the Midco II groundwater area from the property west of the site. There appears to be an off-site component of arsenic, barium, sulfide, iron, barium, and thallium contamination. As a result, it may not be possible to achieve GWCALs for these contaminants. Fluoride needs to be added to the groundwater monitoring list to evaluate whether it exceeds its GWCAL and whether the fluoride contamination is likely to be from Midco II.

<u>For SVE/AS in Cell 1 and the western half of Cell 3, the answer is YES</u>: The SVE/AS system has been successful in removing an estimated 13,000 pounds of VOCs from the

subsurface. There have been substantial reductions in VOCs from soil and groundwater. The SVE/AS operation is being adjusted as needed to assure that all groundwater in the treatment area is treated to the extent possible.

For SVE/AS in Cell 2, Cell 4 and the eastern half of Cell 3, the answer is NO: VOCs still significantly exceed the GWCALs at some wells in these areas. AS was under utilized prior to the vandalism event in June 2007, and the MRC did not repair the SVE/AS electrical system for Cell 2 or Cell 4. The electrical system needs to be repaired, and SVE/AS performed in Cell 2, Cell 4, and the eastern half of Cell 3 to gain the benefit of AS treatment of the groundwater in these areas.

For access controls, the answer is YES: Although the existing controls did not prevent major vandalism in June 2007, there has been no repeat of vandalism since the SVE/AS was restarted in December 2007, and the site fence along with the presence of operating staff is providing sufficient current protection to public health from exposure to the contaminated soil and sediments.

For sediment excavation, the answer is NO: As explained in Section IV, the ROD required that after the sediment excavation, the soils in sediment areas should be below the soil CALs, but these soils actually substantially exceed the soil CALs. As an interim measure until the final site cover is constructed, the flow in the ditch has been diverted, and the contaminated sediment areas have been enclosed in a fence, which effectively prevents human contact with the contaminants, but not necessarily contact by wildlife. However as explained in the *Addendum to Five-Year Review Report*, the wetlands affected are small in area and of low quality. For those reasons, it should be acceptable to delay the final action on these sediments.

For Excavation, Off-site Disposal, and Capping. These operations have not yet been implemented.

For ICs, the answer is NO: As previously explained (see p. 40), deed restrictions required in the Consent Decree are not in place on all properties where contaminants exceed the soil CALs and/or the GWCALs; the existing deed language may not be effective; it is possible for non-potable water usage near Midco II to draw contaminated groundwater off-site; and existing project plans do not include IC monitoring.

Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Objectives Used at the Time of the Remedy Selection Still Valid?

The remedial objectives used at the time of remedy selection are still valid (see Section IV). There have been no changes in the physical conditions at the site that would affect the protectiveness of the remedy.

The 1992 ROD Amendment incorporated specific requirements for soil and groundwater cleanup (soil/sediment CALs and GWCALs), for limiting contaminants in the groundwater prior to deep well injection (MACs), and for air emission criteria. The ROD Amendment also incorporated toxicity factors, and exposure assumptions for calculating risks for use in calculating soil/sediment CALs, GWCALs, and air emission criteria. AWQC were identified for calculating GWCALs for protection of aquatic life, and a conservative dilution factor identified to correct groundwater concentrations for dilution in surface waters. Toxicity factors for a few contaminants were updated or added in ESD#1 (dated 1/9/96) and ESD#2 (dated 11/2/99). Only the GWCALs based on MCLs are automatically updated when MCLs change.

Question B needs to be considered separately for the different media, as discussed below.

<u>For Air Emissions, the answer is YES:</u> The purpose of the 3 pounds/hr limitation on emissions of VOCs as defined under the Clean Air Act is to reduce ozone formation on an area wide basis. This limitation has not become more stringent.

The 1992 ROD Amendment provides a generic procedure for calculation of CR and HI using defined exposure rate assumptions and toxicity factors. Toxicity factors were identified for 36 VOCs, 24 SVOCs, 5 pesticides, and PCBs. The procedure for modeling emissions to obtain ambient air concentrations was not defined in the ROD.

In 2005, as part of the design of the SVE system, ENVIRON developed an air model to estimate the reasonable worst case human health risks to the nearest resident. ENVIRON calculated risks using both the Consent Decree toxicity factors and updated toxicity factors (the air exposure assumptions in the 1992 ROD Amendment were found to be consistent with current procedures). These calculations demonstrated that the updated toxicity factors were not more stringent than those included in the Consent Decree.

<u>For the MACs, the answer is YES:</u> Using an update of the evaluation procedures used in the *Second Five-Year Review Report* (EPA, 2004), it was determined that an update of the MACs is not necessary..

In the 1992 ROD Amendment, the HBLs were identified for 183 hazardous constituents, and the MACs defined as 6.3 times the then existing HBLs. Cumulative risks are not considered. The 6.3 factor provides a very conservative allowance for the protection provided by the location, monitoring and mechanical requirements of the deep well. If an MCL was available, the HBLs were the MCLs. Otherwise, the HBLs were the more stringent of CR = 10^{-6} or HI = 1.0 for residential water usage. The HBL for 1,1-dichloroethane was updated in ESD#1, and the HBLs for a number of carcinogenic PAHs were updated in ESD#2.

The *Second Five-Year Review Report* includes an explanation of how it was determined that 180 groundwater monitoring parameters would be routinely monitored in the influent, including 129 that have assigned MACs. Fifty-four contaminants that have

MACs are not monitored either because there is no reliable analytical method, or because they are not known to have been disposed at Midco II and were not detected in an initial round of sampling. To screen for the need to update the MACs, the *Second Five-Year Review Report* included a comparison of the HBLs, to either the current MCLs, or, for contaminants that did not have MCLs, to the October 2002, EPA Region 9, Preliminary Remediation Goals (PRGs), and to current contaminant concentrations in the pumped groundwater. In this five-year review, this procedure was updated by using the September 12, 2008 Region 3 tap water screening levels (TWSLs) instead of the Region 9 PRGs.

It was found that the TWSLs are more stringent than the current HBL for 49 contaminants. However, the need to update the HBLs was screened out for each of these contaminants for at least one of the following reasons: because they were among the contaminants that had previously been screened out of the monitoring program; because they have not been detected in the influent during the last five years; or because they were detected at concentrations much lower than the TWSLs times 6.3. It is noted that the analytical methods may not be sensitive enough to detect bis(2-chloroethyl)ether or naphthalene at 6.3 times the TWSL[j], but it should not be necessary to develop special analytical methods for these contaminants because bis(2-chloroethyl)ether and naphthalene have not been found to be major contaminants in the groundwater.

The *Second Five-Year Review* Report considered that the method detection limits of the approved analytical method for a number of the hazardous constituents exceed their MACs. EPA considers these constituents to achieve the MACs if they are not detected because they are not known to have been disposed on the Site. This report also reaffirms the conclusion in the *Second Five-Year Review Report* that the twelve contaminants, for which MCLs have been established since 1992, do not need a MAC or to be added to the deep well or groundwater monitoring because they were unlikely to have been disposed at Midco II.

<u>For the GWCALS, the answer is NO:</u> The following conclusion in the *Second Five-Year Review Report* is still valid: some of the GWCALs may need to be updated because they have potential to cause an unacceptable human health or environmental risk at the GWCAL concentration. The most reasonable time to perform this update would be when EPA reviews a petition to turn-off the pump-and-treat system.

In accordance with the ROD Amendment, GWCALs are established at the lowest of the MCLs, the AWQC X 3.9, CR = 1×10^{-5}, or HI = 1.0, with the following exceptions:

- If an MCL is promulgated for a contaminant and that contaminant in a groundwater sample is the only one having a CR $\geq 1 \times 10^{-5}$, then for that sample,

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j For bis(2-chloroethyl)ether, the quantitation level is 5 ug/l, which exceeds 6.3 times the screening level (0.076 ug/l); and for naphthalene, the quantitation level is 5 ug/l, which exceeds 6.3 times the screening level (0.88 ug/l).

the GWCAL for that contaminant defaults to the MCL or AWQC X 3.9 whichever is less, and that contaminant is not used in the CR calculation for that sample;

- If background concentrations or the lowest practical detection limit is less stringent than the lowest of these values, then the background concentration or the detection limit become the GWCAL.

Updates to toxicity values used to calculate CR and HI are only relevant for contaminants that do not have MCLs (unless two or more contaminants contribute to a CR $\geq 1 \times 10^{-5}$), and where detections exceed background and detection limit concentrations. In accordance with the SOW, the MCLs are automatically added or updated when they are promulgated.

In accordance with the SOW and ROD Amendment, the toxicity values for calculation of the CR and HI criteria were defined for 65 of the contaminants on the groundwater monitoring list including for 22 VOCs, 6 low concentration PAHs, 16 other SVOCs, 5 pesticides, 14 metals, cyanide, and PCBs. These were the contaminants of most concern at the site according to the RI. Exposure assumptions were also defined. The AWQC for calculation of the GWCALs were included in the SOW and ROD Amendment for 14 metals, 3 pesticides, pentachlorophenol, cyanide, and PCBs.

In the *Second Five-Year Review Report*, EPA evaluated whether the GWCALs need to be updated by comparing the parameter specific GWCALs (see attached Table 3-1 from the *2005 Annual Monitoring Report)* to the adjusted October 2002 PRGs[k], to the maximum groundwater detections using 2002 data, and to background and detection limits. For contaminants that do not have GWCALs identified in the ROD Amendment, adjusted PRGs were also compared to the maximum groundwater detections, and background and detection limits. The need to update a GWCAL was screened out under the following conditions: if the adjusted PRGs were not significantly more stringent than the GWCALs; if the maximum groundwater concentration was less than the adjusted PRG; or if background or the analytical detection limit exceeded the GWCAL. The contaminants that could not be screened out were: acetone, beta-BHC; chloroethane; ethyl benzene; tetrachloroethylene; trichloroethylene; toluene; xylene; 4-methlylphenol; manganese; naphthalene; n-nitrosopyrrolidine; and hydrogen sulfide.

EPA recently provided updated tap water screening levels (TWSLs) in the Region 3, Risk-Based Concentration Table. Using adjusted[k] TWSLs, EPA found that acetone, trichloroethylene, and toluene could be screened out from needing an update because the adjusted TWSLs are less stringent than the GWCALs. Furthermore, beta-BHC, and n-nitrosopyrrolidine can be screened out because when last sampled in 2004, there were no site related detections exceeding the adjusted TWSLs. However, the need to update GWCALs for ethyl benzene, tetrachloroethylene, xylene, manganese, and

k The TWSLs are estimated to be protection at CR = 10^{-6} for carcinogenic compounds. Because the GWCALs for Midco I were set at CR = 10^{-5} , the TWSLss were adjusted to CR = 10^{-5} or to the HI = 1.0, whichever was more stringent.

naphthalene can not be screened out. The need to update chloroethane, 4-methylphenol, or hydrogen sulfide is not evaluated by this screening because there are no TWSLs for these compounds.

In addition to the human health risks, there is potential for a risk to biota from venting of contaminated groundwater to wetlands north of Midco II. This concern was addressed in the ROD Amendment by setting the GWCAL equal to 3.6 X AWQC, if this value was more stringent than the MCLs, and the CR and HI criteria. Current ecological risk procedures do not allow applying a simple factor to the AWQC to account for dilution in the surface water because this procedure does not take into account impacts on benthic organisms. Using an approach similar to evaluating the CR and HI toxicity factors, the AWQC were compared to updated benchmark values, and the following contaminants could not be screened out: xylenes, barium, manganese, and zinc. In addition, groundwater concentrations exceed the AWQC X 3.6 for hydrogen sulfide, which did not have an AWQC listed in the ROD Amendment.

It is expected that the SVE/AS will substantially reduce VOCs and possibly other contaminants. Therefore, it is uncertain which, if any, of these contaminants will remain a concern when the SVE/AS is completed.

<u>For Soil/Sediment CALs, the answer is NO:</u> A risk screening using updated toxicity factors would not change the conclusion from the 1998 *Five-Year Review Report* that the soil/sediment CALs were not achieved in the Midco II sediment areas, and that ecological risks need to be further evaluated if the final remedy leaves the sediments uncovered. The 1998 *Five-Year Review Report* identified that the soil/sediment CALs were exceeded for arsenic, carcinogenic PAHs, and lead. Contaminants were detected in the sediments samples at concentrations as high as: arsenic – 146 mg/kg; carcinogenic PAHs - 350 mg/kg; and lead - 630 mg/kg. The pesticide/PCB data generated for the sediment excavation was unusable, but RI data identified concentrations as high as: chlordane – 15 mg/kg and PCBs – 34 mg/kg. An ecological risk assessment would probably identify other benchmarks for cleanup and other contaminants of concern. The most efficient time to perform this evaluation, if needed, would be in the design document for the final site cover.

Question C: Has any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?

All known relevant information has been addressed in previous portions of this report.

Technical Assessment Summary

The groundwater pump-and-treat / deep well injection system, is successfully containing the groundwater contamination, and is apparently helping to reduce contaminant concentrations in groundwater. The SVE/AS has been successful in removing VOCs, and in reducing VOC concentrations in soil and groundwater. The SVE/AS is being adjusted to complete removal of VOCs from groundwater in Cell 1 and the western portion of Cell 3. Fluoride needs to be added to the groundwater monitoring parameter list so that we can assess whether it exceeds GWCALs, and whether fluoride contamination is migrating from Midco II. The SVE/AS for Cell 2, Cell 4, and the eastern half of Cell 3, needs to be repaired and operated to complete the groundwater cleanup. Achievement of the GWCALs for some contaminants may not be possible because of contamination from off-site.

Some sediments from the ditch north of Midco II have been excavated and contained on-site, but sediments and soils remaining in the ditch still exceed the soil/sediment CALs, *and actions to fully address these risks are being delayed until the final site cover* is constructed. In the meantime human access to these soils is restricted by a fence, and ecological risks are ongoing but are considered to be minor.

Access controls appear to be acceptable, although these measures did not prevent major vandalism on June 21, 2007. Additional IC work is needed.

This review determined that the air emission criteria and MACs do not need to be updated. The GWCALs and soil/sediment CALs may need to be updated to be protective of human health and the environment when the remedial actions are completed.

VIII. Issues

Table 11: Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1. Fluoride is not being monitored in the groundwater, but is likely to exceed its GWCAL, and the fluoride contamination may be from Midco II	N	Y
2. Contamination from off-site may make it impossible for the pump-and-treat system to achieve all GWCALs	N	Y
3. GWCALs may not be protective	N	Y
4. SVE/AS has not been performed in Cell 2, Cell 4, and eastern portion of Cell 3, where some VOCs significantly exceed GWCALs	N	Y
5. Sediments and soils in the ditch exceed CALs	N	Y
6. Sediment/soil CALs may not be protective	N	Y
7. IC work not complete	N	Y

IX. Recommendations and Follow-up Actions

Table 12: Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
1	Add fluoride to the groundwater monitoring parameter list	MRC	IDEM, EPA	5/1/2009	N	Y
2, 3	Evaluate and update GWCALs at the time of review of request to shut-down pump-and-treat	MRC	IDEM, EPA	12/31/2011	N	Y
4	Repair SVE/AS for Cells 2 and 4, and re-initiate treatment	MRC	IDEM, EPA	12/31/2009	N	Y
5, 6	Evaluate whether to cover or excavate the sediments, and update of soil/ sediment CALs during review of design for site cover	MRC	IDEM, EPA	12/31/2011	N	Y
7	File updated restrictive covenants for all necessary properties	MRC	IDEM, EPA	12/31/2009	N	Y
7	Work with City of Gary to assure notification of non-potable groundwater usage near Midco II	MRC	IDEM, EPA	12/31/2009	N	Y
7	Add IC monitoring to O&M plan	MRC	IDEM, EPA	12/31/2009	N	Y
7	Further evaluate and implement ICs, as necessary to enhance the long-term protectiveness of the remedy.	MRC	IDEM, EPA	12/31/2009	N	Y

X. Protectiveness Statement

The remedy protects human health and the environment in the short term because:

- fencing, deed restrictions on some properties, and on-site staff prevent human exposure to the contaminated groundwater, soils and sediments (a City of Gary ordinance also prohibits residential usage of groundwater);
- although wildlife can be exposed to the contaminants remaining in the sediment areas, the area affected is small, the value of the habitat is minor, and the contaminant concentrations may not exceed background; and
- monitoring is being performed to assure compliance with air emission limitations,

and the regenerative thermal oxidizer is being maintained to treat the air emissions, if necessary.

In order for the remedy to be protective in the long-term, the following actions are needed:

- continued restriction of access;
- continued O&M, and monitoring of the pump-and-treat system to contain the contaminated groundwater and attempt to achieve the GWCALs (Operable Unit #1);
- repair and continued O&M and monitoring of the SVE/AS system to effectively treat all areas where the contaminated groundwater exceeds the GWALs;
- addition of fluoride to the groundwater monitoring;
- excavation of high metals and cyanide contamination (Operable Unit #2);
- *consideration, and if necessary, evaluation of ecological risks and adjustment of* the soil/sediment CALs during design of the site cover and final sediment excavation;
- completion of sediment excavation;
- installation of the final site cover (Operable Unit #3);
- update the GWCALs; and
- full implementation and monitoring of ICs.

XI. Next Review

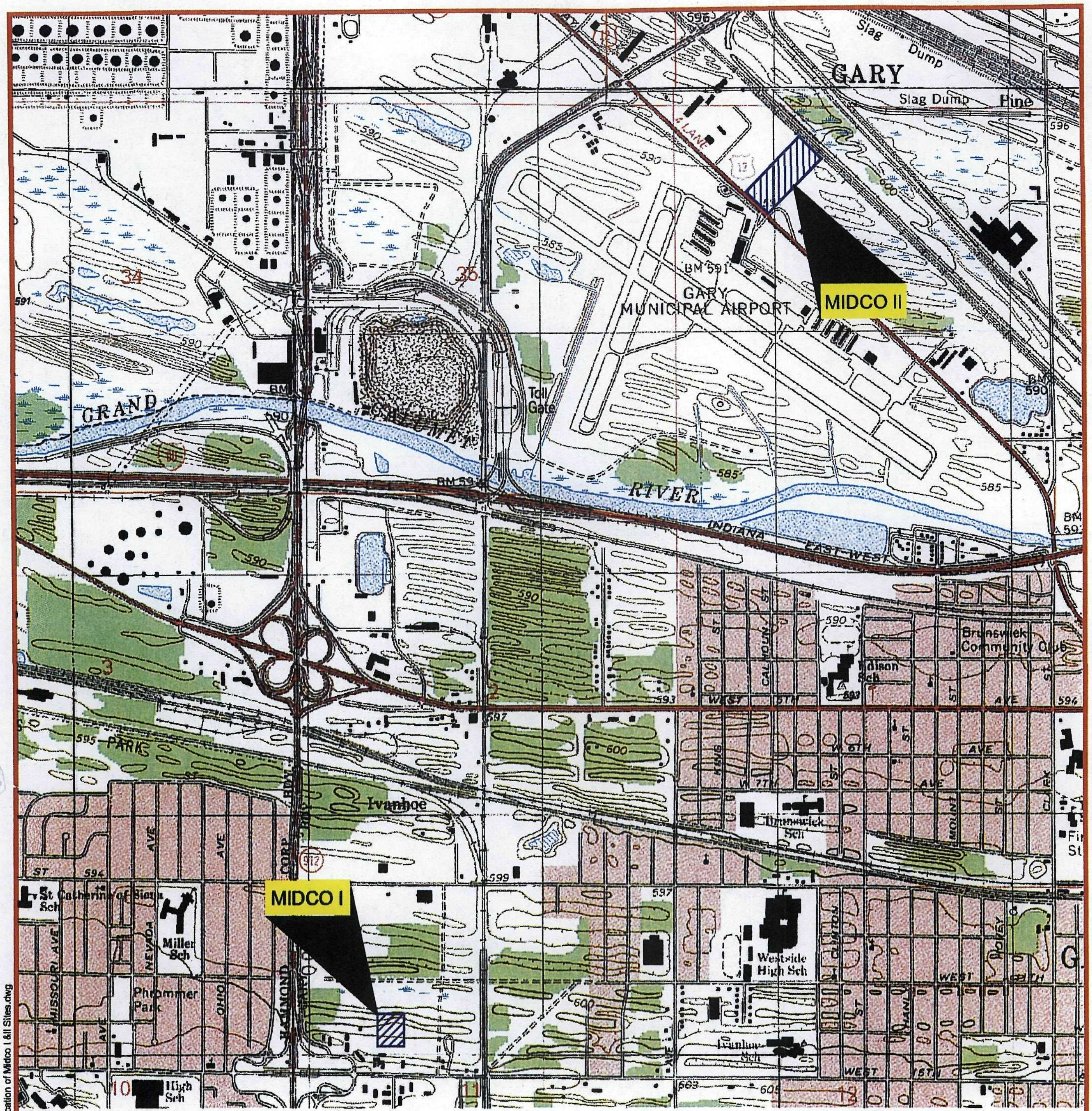
The next five-year review is scheduled five-years from the date of this report.

TABLE 4: EPA, Weston and IDEM Inspections of Midco I from April 2004 – December 2008

DATE	INSPECTOR	RESULTS
5/24-27/ 2004	T. Cagney, Weston	Oversight of annual groundwater sampling. No deviations from the workplan were observed. Noted that locks need to be replaced, monitoring wells relabeled, and some pumps replaced.
6/16/2004	O. Patel	Inspected groundwater treatment, and waste storage. No problems noted.
6/22/2004	R. Boice, EPA	Inspected groundwater treatment, and waste storage. Interviewed Terry Claus, ENVIRON site operator. No problems identified.
10/19/2004	O. Patel	Oversight of quarterly effluent sampling. No deficiencies were noted in the sampling. Noted that GC was not operative.
11/2/2004	R. Boice O. Patel	SVE/AS preconstruction meeting, inspected groundwater treatment. No problems identified.
5/6/2004 – 6/10/2004	T. Borman, B. Maradkel, M. Castillo, and T. Carmichael, of Weston	Oversight of installation of the temporary vapor barrier. Noted that soil was hummocky prior to placement of temporary vapor barrier. ENVIRON worked with representatives of the City of Gary and the Gary-Chicago Airport to address concerns about dirt on Industrial Highway and generation of dust. ENVIRON proposed to take measures to keep the ground surface wet, and to use a street sweeper on Industrial Highway.
5/10/2005	R. Boice	Inspected completion of construction of subsurface horizontal SVE well installation and grading, and groundwater treatment. No problems identified.
6/9/2005	R. Boice S. Ryan, Weston O. Patel	Inspected temporary vapor barrier installation, and groundwater treatment. No problems identified.
6/20-24/05 6/30/05	T. Carmichael T. Bradley, Weston	Oversight of annual groundwater sampling. No deviations from the site work plan or Health and Safety Plan were identified.
7/13-18/05 7/20-22/05 7/25-29/05 8/1-5/05 8/8-12/05 8/15-19/05 8/22-23/05 8/25-26/08 8/29-30/08	T. Walls, Weston A. Rodriguez, Weston	Oversight of installation of AS wells and soil gas, pressure, and air sparge monitoring wells. All work appeared to have been completed in accordance with approved work plans, and the Health and Safety Plan.
7/21/05	R. Boice Weston	Oversight of SVE well and soil gas monitoring well installation. Requested more systematic decontamination.

DATE	INSPECTOR	RESULTS
10/26/05	R. Boice O. Patel, Weston	Inspect SVE/AS, soil gas sampling, and waste storage. Not all hazardous waste drums were labeled. Exclusion zone was not marked. Weston was concerned that blower fans and heater be explosion proof, and recommended LEL meter on each blower building.
10/25-26/05	N. Save, Weston	Oversight of the baseline soil gas sampling. No deviations from planning documents were observed.
11/18/05	R. Boice O. Patel S. Ryan	SVE/AS pre-final inspection, inspected groundwater treatment and waste storage. The construction inspection files and logbook were not available at Midco II. Weston prepared punch list of items that needed to be completed.
11/29/05	O. Patel	Follow up construction inspection.
2/17/06 2/24/06 2/27/06 3/14/06 3/22/06 4/6/06 4/20/06 4/25-27/06 5/4/06 5/11/06 5/18/06 5/23/06 5/30/06	J. Klemp, Weston T. Walls, Weston J. Klemp	Oversee monitoring of SVE/AS during commissioning and early operational period. No deviations from plans noted. Also observed bailing of M2C3TW-01 for LNAPL. None observed.
5/4/06	S. Dischall, IDEM	RCRA inspection of site storage. No violations reported.
5/15/06	R. Boice O. Patel	Inspected SVE/AS and groundwater treatment. Identified that GC was not operational, that a number of AS wells had not been operational, and need to inspect and replace plugs on SVE piping.
7/24-26/06	J. Klemp	Oversee quarterly monitoring of SVE/AS. No deviations from plans noted.
8/30/06	J. Klemp	Oversee quarterly monitoring of SVE/AS. No deviations from plans noted.
10/24-25/06	J. Klemp	Oversee quarterly monitoring of SVE/AS. Reported that all AS wells were down.
10/30-11/1/06	T. Walls	Oversee quarterly groundwater sampling for SVE/AS. No deviations from plans reported.
1/22/07	R. Boice S. Andrews, IDEM S. Summer, IDEM K. Spindler, IDEM K. Johnson, IDEM	Inspected groundwater treatment, deep well, SVE/AS, east part of ditch bypass, and on-site storage. According to Claus, the deep well was operating at a reduced rate using a backup pump because the primary pump was not working. Two roll-off boxes were not properly labeled. Interviewed Claus and Bill Bow (LFR). No problems were identified in the groundwater treatment or SVE. Provided orientation for IDEM staff, who will be replacing Weston in providing oversight support to EPA.
4/25/07	S. Summer	Inspected annual groundwater sampling, waste storage, groundwater treatment, deep well, and SVE/AS.
7/30/07	R. Boice	Observe results of vandalism of SVE/AS, soil gas sampling, waste storage and deep well. Observed that Summa canister for soil gas sampling was being placed after the

DATE	INSPECTOR	RESULTS
		pump instead of before the pump, as provided for in sampling plans.
8/1/07	K. Johnson	Inspected groundwater treatment, SVE, on-site storage, air sampling, waste storage, deep well. No problems identified.
11/6/07	R. Boice	Observed progress of repairs to SVE/AS. Trenching had been conducted to bury conduit, but it did not extend below clean material.
12/19/07	R. Boice	Inspected groundwater treatment, reconstructed SVE/AS, on-site storage, and ditch bypass. Interviewed Tat Ebihara of LFR. No problems were identified.
3/25/08	R. Boice	Inspected groundwater treatment, SVE/AS, SVE/AS monitoring, and on-site storage. Documented that soil gas sampling procedures were different from approved plan, that the door to compressor building needed to be repaired, and that hazardous waste signs had blown off of the roll-off boxes. Observed that Velocicalc Plus could not measure velocity at 10 AS wells because of water in sparging lines.
4/28/08	R. Boice S. Andrews	Inspected groundwater treatment, deep well, groundwater sampling, SVE/AS, and on-site storage. Interviewed Claus, and Coughlin of ENVIRON, and Bill Bow of LFR, about operations. Discussed problem of water in AS piping, and efforts to clean Midco II pumping wells in the northern part of site to increase flow rates and improve capture. Claus said that the deep well piping was last replaced in 2001, and that ENVIRON plans to replace the piping using high pressure HDPE.
4/30/08	R. Boice	Inspected groundwater sampling. No problem identified.
5/28/08	K. Johnson	Inspected SVE/AS sampling, and regenerative thermal oxidizer. No problem identified.
8/20/08	S. Andrews	Oversaw interim soil gas sampling. No problems identified.
8/26/08	R. Boice	Inspected groundwater treatment, deep well, SVE/AS, eastern side of ditch bypass, and waste storage. No problems identified except hazardous waste label had fallen off one roll-off box.



SCALE 1: 24000

1 1/2 0 1 MILE

2000 0 2000 4000 6000 FEET

1 .5 0 1 KILOMETER

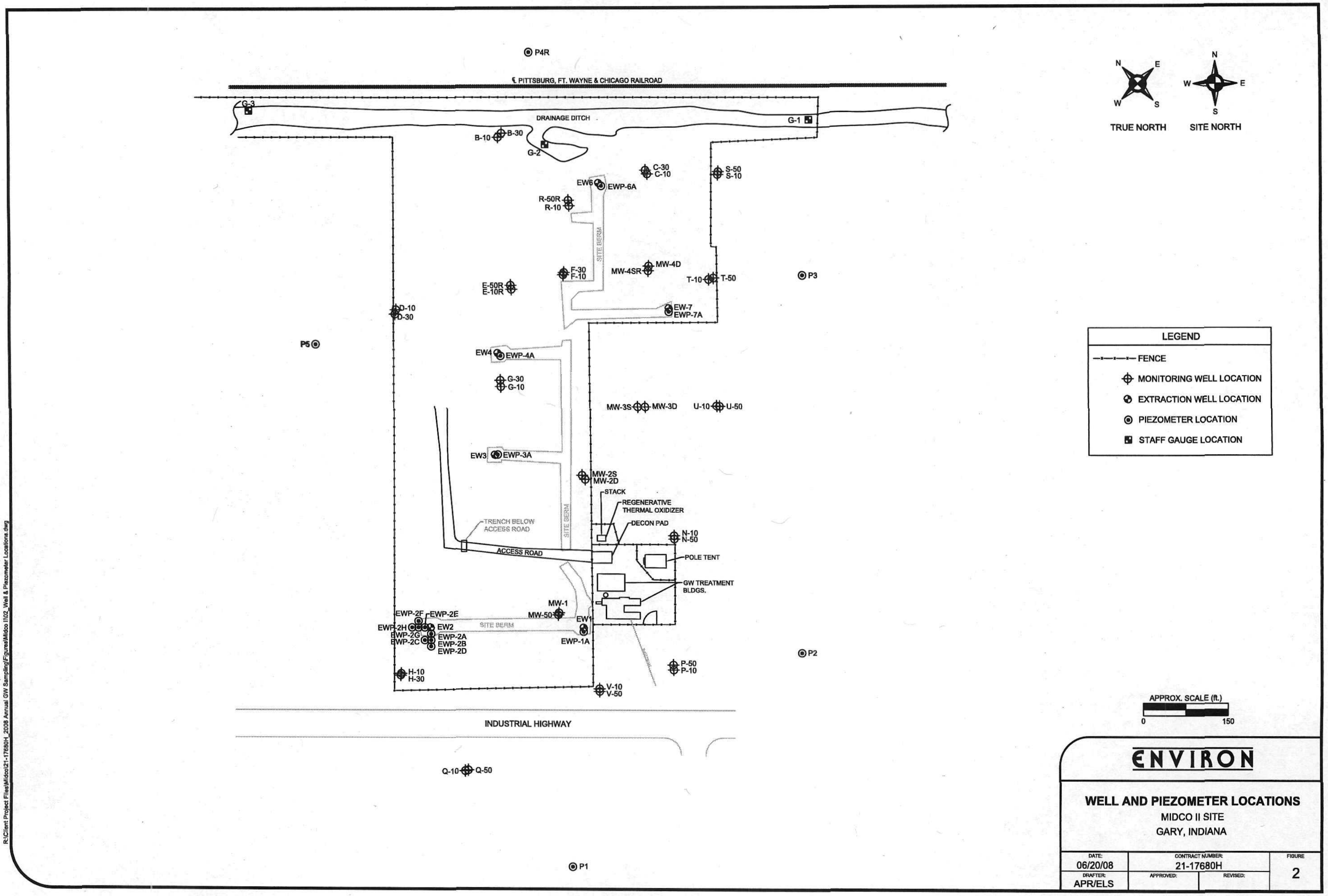
CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

SOURCE: U.S.G.S. 7.5 minute series (topographic)
Highland Quadrangle, Indiana 1991
Whiting Quadrangle, Indiana 1991

R:\Client Project Files \Midco\Midco II SVE AS Final Design 21-8601AE \Figures\1 Location of Midco I &II Sites.dwg

ENVIRON 740 Waukegan Road, Suite 401, Deerfield, IL 60015	Location of Midco I and Midco II Sites Gary, Indiana	Figure 1

Drafter: CJG Date: 3/4/04 Contract Number: 21-8601AE Approved: Revised:



WELL AND PIEZOMETER LOCATIONS
MIDCO II SITE
GARY, INDIANA

TABLE 1-1

LIST OF PARAMETERS ANALYZED AND PROJECT-SPECIFIC QUANTITATION LIMITS
MIDCO I AND II SITES
GARY, INDIANA

Chemical	*Project-Specific Quantitation Limit*[1] *(µg/L)*	*Chemical*	*Project-Specific Quantitation Limit*[1] *(µg/L)*
MIDCO I AND II SITES		*MIDCO I AND II SITES*	
Volatile Organic Compounds		**Inorganic Analytes**	
Acetone	5	Aluminum	21
Benzene	1	Antimony	1
Bromochloromethane	1	Arsenic	2
Bromodichloromethane	1	Barium	20
Bromoform	1	Beryllium	1
Bromomethane	1	Cadmium	1
2-Butanone	5	Calcium	5,000
Carbon disulfide	1	Chromium	1
Carbon tetrachloride	1	Chromium (VI)	10
Chlorobenzene	1	Cobalt	1
Chlorodibromomethane	1	Copper	1
Chloroethane	1	Cyanide	10
Chloroform	1	Iron	50
Chloromethane	1	Lead	1
1,2-Dibromo-3-chloropropane (DBCP)	1	Magnesium	5,000
1,2-Dibromoethane (Ethylene dibromide)	1	Manganese	25
1,2-Dichlorobenzene	1	Mercury	0.2
1,3-Dichlorobenzene	1	Nickel	7
1,4-Dichlorobenzene	1	Potassium	5,000
1,1-Dichloroethane	1	Selenium	2
1,2-Dichloroethane	1	Silver	1
1,1-Dichloroethene	1	Sodium	5,000
cis-1,2-Dichloroethene	1	Sulfide	1,000
trans-1,2-Dichloroethene	1	Thallium	3
1,2-Dichloropropane	1	Vanadium	1
cis-1,3-Dichloropropene	1	Zinc	1
trans-1,3-Dichloropropene	1		
Ethylbenzene	1		
2-Hexanone	5		
Methylene chloride	1		
4-Methyl-2-pentanone	5		
Styrene	1		
1,1,2,2-Tetrachloroethane	1		
Tetrachloroethene	1		
Toluene	1		
1,2,4-Trichlorobenzene	1		
1,1,1-Trichloroethane	1		
1,1,2-Trichloroethane	1		
Trichloroethene	1		
Vinyl chloride	1		
Xylenes (Total)	5		

Notes:

µg/L = micrograms per liter.

[1] Detection limits are highly matrix dependent. Limits provided herein may not always be achievable.

TABLE 1-1

LIST OF PARAMETERS ANALYZED AND PROJECT-SPECIFIC QUANTITATION LIMITS
MIDCO I AND II SITES
GARY, INDIANA

Chemical	*Project-Specific Quantitation Limit*[1] *(μg/L)*	*Chemical*	*Project-Specific Quantitation Limit*[1] *(μg/L)*
MIDCO I SITE ONLY		*MIDCO I SITE ONLY*	
Semivolatile Organic Compounds		**Semivolatile Organic Compounds**	
Acenaphthene	5	2,6-Dinitrotoluene	5
Acenaphthylene	5	Di-n-octyl phthalate	5
Acetophenone	10	Diphenylamine	10
2-Acetylaminofluorene	10	Fluoranthene	5
Anthracene	5	Fluorene	5
Aramite	20	Hexachlorobenzene	5
Benzo(a)anthracene	--	Hexachlorobutadiene	5
Benzo(b)fluoranthene	--	Hexachlorocyclopentadiene	5
Benzo(k)fluoranthene	5	Hexachloroethane	5
Benzoic acid	20	Indeno(1,2,3-cd)pyrene	--
Benzo(g,h,i)perylene	5	Isodrin	10
Benzo(a)pyrene	--	Isophorone	5
Benzyl alcohol	5	2-Methylnaphthalene	5
bis(2-Chloroethoxy)methane	5	2-Methylphenol	20
bis(2-Chloroethyl)ether	5	3-Methylphenol	5
bis(2-Ethylhexyl)phthalate	5	4-Methylphenol	5
4-Bromophenyl phenyl ether	5	Naphthalene	10
Butyl benzyl phthalate	5	2-Nitroaniline	20
4-Chloroaniline	5	3-Nitroaniline	20
Chlorobenzilate	10	4-Nitroaniline	20
4-Chloro-3-methylphenol	5	Nitrobenzene	5
2-Chloronaphthalene	5	2-Nitrophenol	5
2-Chlorophenol	5	4-Nitrophenol	20
4-Chlorophenyl phenyl ether	5	N-Nitroso-di-n-propylamine	5
Chrysene	--	N-Nitrosodiphenylamine	5
Dibenzo(a,h)anthracene	--	N-Nitrosomorpholine	10
Dibenzofuran	5	N-Nitrosopyrrolidine	10
Di-n-butyl phthalate	5	2,2'-Oxybis(1-chloropropane)	5
3,3'-Dichlorobenzidine	5	Pentachlorophenol	20
2,4-Dichlorophenol	5	Phenanthrene	5
Diethyl phthalate	5	Phenol	10
2,4-Dimethylphenol	5	Pronamide	10
Dimethyl phthalate	5	Pyrene	5
1,3-Dinitrobenzene	20	2,3,4,6-Tetrachlorophenol	20
4,6-Dinitro-2-methylphenol	20	1,2,4-Trichlorobenzene	5
2,4-Dinitrophenol	20	2,4,5-Trichlorophenol	20
2,4-Dinitrotoluene	5	2,4,6-Trichlorophenol	5

Notes:

μg/L = micrograms per liter.

-- = PSQL not defined for this compound for this method.

[1] Detection limits are highly matrix dependent. Limits provided herein may not always be achievable.

TABLE 1-1

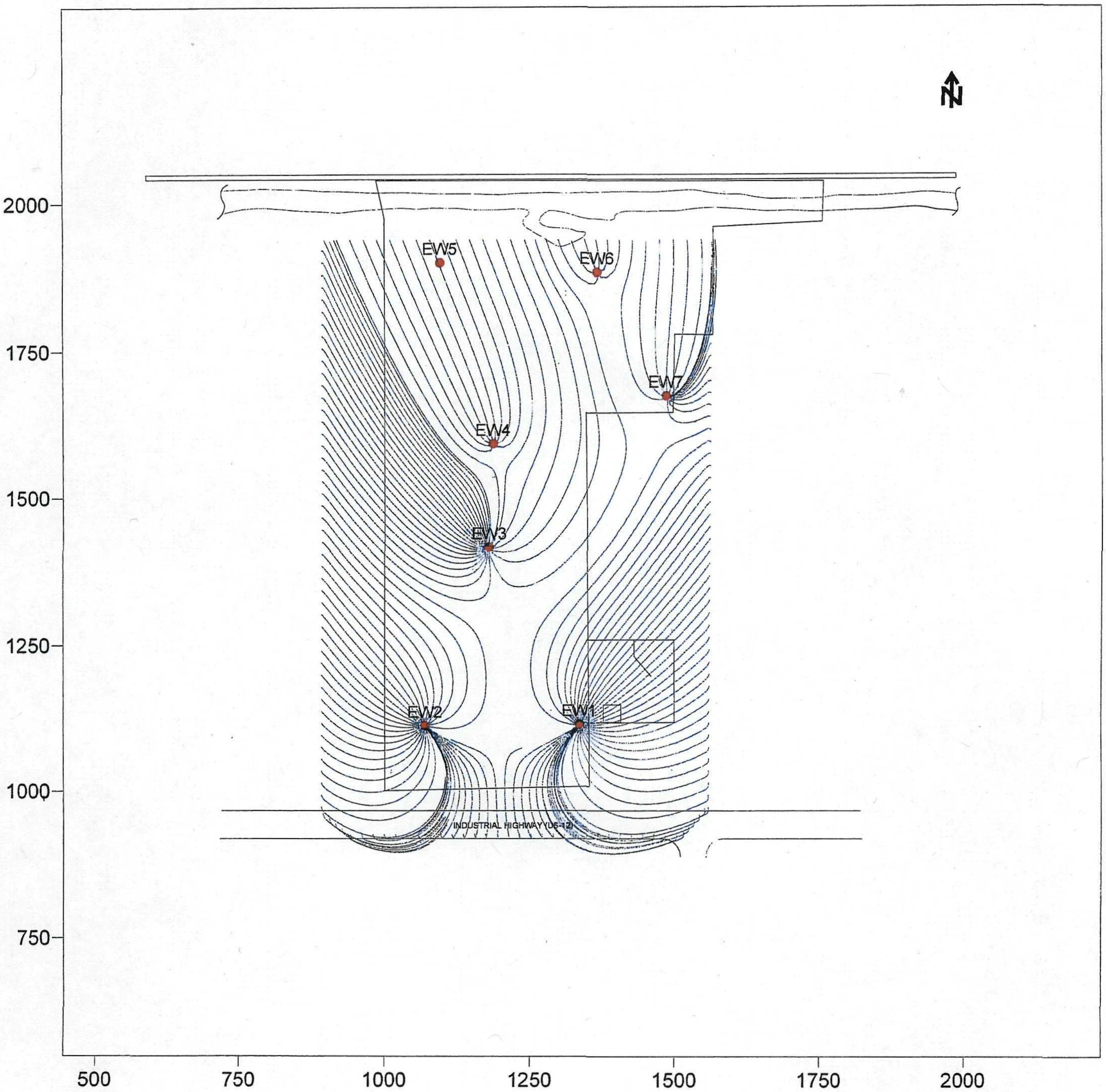
LIST OF PARAMETERS ANALYZED AND PROJECT-SPECIFIC QUANTITATION LIMITS
MIDCO I AND II SITES
GARY, INDIANA

Chemical	*Project-Specific Quantitation Limit*[1] *(µg/L)*	*Chemical*	*Project-Specific Quantitation Limit*[1] *(µg/L)*
MIDCO I SITE ONLY		*MIDCO I SITE ONLY*	
Chlorinated Pesticides		**Polycyclic Aromatic Hydrocarbons**	
Aldrin	0.01	Benzo(a)anthracene	0.001
α-BHC	0.01	Benzo(b)fluoranthene	0.005
β-BHC	0.01	Benzo(a)pyrene	0.001
δ-BHC	0.01	Chrysene	0.005
γ-BHC (Lindane)	2	Dibenzo(a,h)anthracene	0.0025
α-chlordane	0.01	7,12-Dimethylbenz(a)anthracene	0.037
γ-Chlordane	0.01	Indeno(1,2,3-cd)pyrene	0.005
4,4'-DDD	0.02	3-Methylcholanthrene	0.039
4,4'-DDE	0.02		
4,4'-DDT	0.02	**Organophosphorous Pesticides**	
Dieldrin	0.005	Dimethoate	10
Endosulfan I	0.01	Ethyl parathion	10
Endosulfan II	0.02	Famphur	21.2
Endosulfan sulfate	0.02	Methyl parathion	0.5
Endrin	0.02	Thionazin	10
Endrin aldehyde	0.02		
Endrin ketone	0.02	**Herbicides**	
Heptachlor	0.01	2,4-D	30
Heptachlor epoxide	0.01	Dinoseb	1
p,p'-Methoxychlor	0.1	2,4,5-T	2
Toxaphene	1	2,4,5-TP (Silvex)	4
Polychlorinated Biphenyls		**Direct Injection Volatile Organic Compounds**	
Aroclor-1016	0.41	1,4-Dioxane	20
Aroclor-1221	0.41	Methanol	20
Aroclor-1232	0.41		
Aroclor-1242	0.41		
Aroclor-1248	0.41		
Aroclor-1254	0.41		
Aroclor-1260	0.41		

Notes:

µg/L = micrograms per liter.

[1] Detection limits are highly matrix dependent. Limits provided herein may not always be achievable.



LEGEND

- Extraction Well
- Calibration Target
- Simulated Groundwater Flowpath (Particle Tracking)

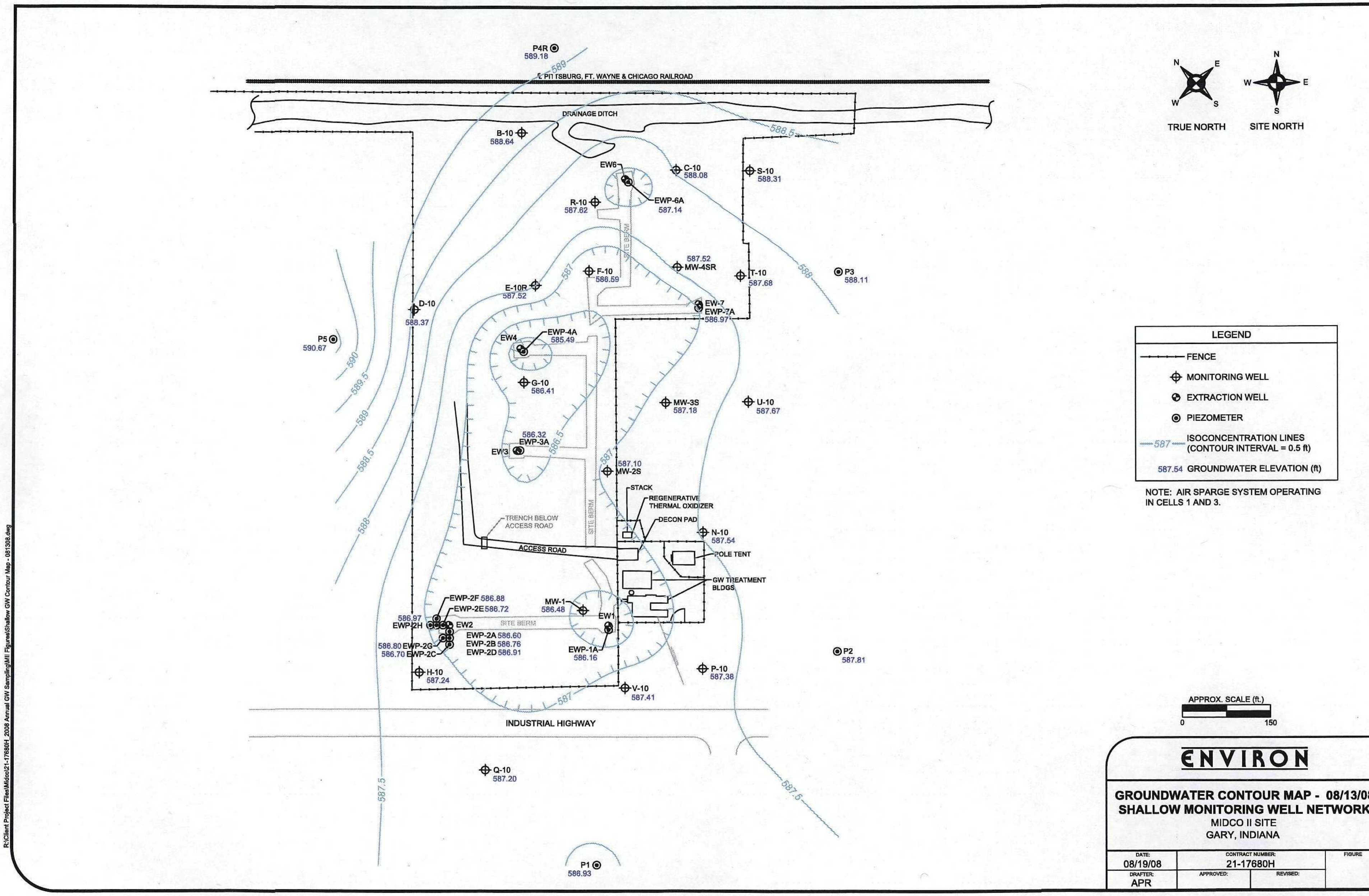
SCALE 1" = 250'

MIDCO

FIGURE II-6
CAPTURE ZONE ANALYSIS
JUNE 2005 EXTRACTION RATES
ADJUSTED GENERAL HEAD BOUNDARIES
MIDCO II SITE, GARY, INDIANA

PROJECT:MIDCO	DATE: APRIL 2006
DWG:MIDCO2FIG6.SRF	BY: EPL CHECKED: SH

ENVIRON



P4R 589.18
PITTSBURG, FT. WAYNE & CHICAGO RAILROAD
DRAINAGE DITCH
B-10 588.64
C-10 588.08
S-10 588.31
EW6
EWP-6A 587.14
R-10 587.62
SITE BERM
587.52 MW-4SR
F-10 586.59
T-10 587.68
P3 588.11
E-10R 587.52
D-10 588.37
EW-7
EWP-7A 586.97
P5 590.67
EW4
EWP-4A 585.49
G-10 586.41
MW-3S 587.18
U-10 587.67
586.32 EWP-3A
EW3
587.10 MW-2S
STACK
REGENERATIVE THERMAL OXIDIZER
DECON PAD
TRENCH BELOW ACCESS ROAD
ACCESS ROAD
N-10 587.54
POLE TENT
GW TREATMENT BLDGS
EWP-2F 586.88
EWP-2E 586.72
586.97 EWP-2H
EW2
MW-1 586.48
EW1
EWP-2A 586.60
EWP-2B 586.76
EWP-2D 586.91
586.80 EWP-2G
586.70 EWP-2C
EWP-1A 586.16
P2 587.81
H-10 587.24
V-10 587.41
P-10 587.38
INDUSTRIAL HIGHWAY
Q-10 587.20
P1 586.93
589
588.5
588
587.5
587
586.5
590
589.5
TRUE NORTH
SITE NORTH
LEGEND
FENCE
MONITORING WELL
EXTRACTION WELL
PIEZOMETER
587 ISOCONCENTRATION LINES (CONTOUR INTERVAL = 0.5 ft)
587.54 GROUNDWATER ELEVATION (ft)
NOTE: AIR SPARGE SYSTEM OPERATING IN CELLS 1 AND 3.
APPROX. SCALE (ft.)
0
150
ENVIRON
GROUNDWATER CONTOUR MAP - 08/13/08
SHALLOW MONITORING WELL NETWORK
MIDCO II SITE
GARY, INDIANA
DATE: 08/19/08
CONTRACT NUMBER: 21-17680H
FIGURE
DRAFTER: APR
APPROVED:
REVISED:

TABLE 5-2

SUMMARY OF THE COMPARISON OF ANALYTICAL RESULTS WITH THE CLEAN-UP ACTION LEVELS (1,2,3)
MIDCO II SITE, GARY, INDIANA
(Page 1 of 4)

	Carcinogenic Risk (4)			Noncarcinogenic Risk (4)			Parameters at or Above MCL or AWQC				Background
Monitoring Location	Total	Contributing Parameters	Concentration (μg/L)	Total	Contributing Parameters	Concentration (μg/L)	Parameter	Concentration (μg/L)	MCL (μg/L)	AWQC (μg/L)	Concentration (5) (μg/L)
MW-1 (6)	7E-05	1,1-Dichloroethene	0.21 J	1	1,2-Dichlorobenzene	61	Trichloroethene	22	5		
		Trichloroethene	22		Nickel	88.7	Cyanide	537	200	18.7	158
					Cyanide	537					
MW-50	3E-03	Aroclor-1248	3.5	6	Arsenic	44.9	Aroclor-1248	3.5	0.5		
		Arsenic	44.9		Barium	7,520	Arsenic	44.9	10	173	15.1
							Barium	7,520	2,000		107
							Iron	33,600		3,600	15,300
MW-2S	4E-07			0.1							
MW-2D	3E-03	(7)		4	Antimony	2.1	Arsenic	46.6	10	173	15.1
					Arsenic	46.6	Barium	3,240	2,000		107
					Barium	3,240	Iron	15,900		3,600	15,300
MW-3S	1E-03	alpha-Chlordane	0.024	2	Antimony	2.7 J	Arsenic	24	10	173	15.1
		Arsenic	24.1		Arsenic	24.1	Iron	44,200		3,600	15,300
					Manganese	4,570					
MW-3D	4E-03	Benzene	0.051 J	3	Arsenic	80.9	Arsenic	80.9	10	173	15.1
		Arsenic	80.9		Barium	687	Iron	27,900		3,600	15,300
MW-4S											
MW-4D (6)	8E-03	Methylene Chloride	830	30	2-Butanone	12,000 J	Methylene Chloride	830	5		1.9
		Tetrachloroethene	140 J		Arsenic	122	Tetrachloroethene	140 J	5		
		Arsenic	122		Barium	6,250	Arsenic	122	10	173	15.1
					Nickel	778	Barium	6,250	2,000		107
							Mercury	0.26	2	0.0432	0.25
B-10	1E-03	1,1-Dichloroethene	0.12 J	0.8			Arsenic	21.7	10	173	15.1
		Arsenic	21.7								
B-30 (6)	3E-03	(7)		3	Arsenic	52.9	Arsenic	52.9	10	173	15.1
					Barium	913					
C-10	6E-03	Aroclor-1248	3.6	0.9			Benzene	8.6	5		0.04
		Benzo(b)fluoranthene	4.5				Aroclor-1248	3.6	0.5		
		Benzo(a)pyrene	4.6				Benzo(a)pyrene	4.6	0.2		
		Dibenzo(a,h)anthracene	4.7				Arsenic	19.3	10	173	15.1
		Arsenic	19.3								
C-30	4E-03	4,4'-DDT	0.30 J	3	Antimony	3.0 J	Arsenic	65.7	10	173	15.1
		Arsenic	65.7		Arsenic	65.7	Chromium (III) (9)	230	100	2,010	7.5
					Barium	757					
					Nickel	109					
D-10	4E-04	1,1-Dichloroethene	0.76 J	0.1			1,2-Dichloropropane	9.0	5		
		1,2-Dichloropropane	9.0				Benzene	58	5		0.04
		Benzene	58								
		Benzo(a)anthracene	3.9								
D-30	4E-03	Benzene	2.9	2	Arsenic	65.8	Arsenic	65.8	10	173	15.1
		Arsenic	65.8		Barium	179					

TABLE 5-2

SUMMARY OF THE COMPARISON OF ANALYTICAL RESULTS WITH THE CLEAN-UP ACTION LEVELS (1,2,3)
MIDCO II SITE, GARY, INDIANA
(Page 2 of 4)

Monitoring Location	Carcinogenic Risk (4) Total	Carcinogenic Risk (4) Contributing Parameters	Carcinogenic Risk (4) Concentration (µg/L)	Noncarcinogenic Risk (4) Total	Noncarcinogenic Risk (4) Contributing Parameters	Noncarcinogenic Risk (4) Concentration (µg/L)	Parameters at or Above MCL or AWQC: Parameter	Concentration (µg/L)	MCL (µg/L)	AWQC (µg/L)	Background Concentration (5) (µg/L)
E-10R (6)	6E-03	1,1-Dichloroethene	24 J	6	Ethyl Benzene	5,500	1,1-Dichloroethene	24 J	7		
		Benzene	92 J		Xylenes (Total)	10,000	Trichloroethene	20 J	5		
		Chrysene	34		Arsenic	47.0	Benzene	92 J	5		0.04
		Arsenic	47.0				Tetrachloroethene	36 J	5		
							Ethyl Benzene	5,500	700		
							Arsenic	47.0	10	173	15.1
E-50R	3E-03	Benzene	0.11	3	Arsenic	56.7	Arsenic	56.7	10	173	15.1
		Arsenic	56.7		Barium	1,240					
F-10	6E-04	Vinyl Chloride	4.7 J	3	1,1-Dichloroethane	49 J	Vinyl Chloride	4.7 J	2		2.2
		1,2-Dichloropropane	34 J		4-Methyl-2-Pentanone	3,900 J	1,2-Dichloropropane	34 J	5		
		Benzene	4.6		Ethyl Benzene	310 J					
					Xylenes (Total)	870 J					
					Manganese	641					
F-30 (6)	2E-03	Methylene Chloride	100	4	4-Methyl-2-Pentanone	3,700 J	Methylene Chloride	100	5		1.9
		Arsenic	38.5		Arsenic	38.5	Arsenic	38.5	10	173	15.1
					Barium	499					
G-10 (6)	1E-05	Trichloroethene	7.6 J	3	1,1-Dichloroethane	330	Trichloroethene	7.6 J	5		
		4,4'-DDT	0.0065 J		Manganese	914	Copper	478		120	25.2
					Nickel	225					
G-30	2E-03	Methylene Chloride	81	2	Arsenic	43.5	Methylene Chloride	81	5		1.9
		Arsenic	43.5		Barium	672	Arsenic	43.5	10	173	15.1
H-10	0E+00			0.5							
H-30	2E-03	Benzene	0.12 J	2	Arsenic	38.0	Arsenic	38.0	10	173	15.1
		Arsenic	38.0		Barium	1,490	Chromium (III) (9)	513	100	2,010	7.5
					Nickel	163 J					
N-10	1E-03	1,1-Dichloroethene	0.10 J	1	Antimony	2.9 J	Arsenic	21.6	10	173	15.1
		Arsenic	21.6		Arsenic	21.6					
N-50 (6)	4E-03	4,4'-DDT	0.0062 J	3	Antimony	2.3 J	Arsenic	76.0	10	173	15.1
		Arsenic	76.0		Arsenic	76.0	Iron	46,800		3,600	15,300
					Barium	947					
P-10	4E-05	1,1,2,2-Tetrachloroethane	1.4	0.3							
P-50	4E-03	(7)		3	Antimony	2.8 J	Arsenic	76.7	10	173	15.1
					Arsenic	76.7	Iron	35,400		3,600	15,300
					Barium	311					
Q-10	3E-03	4,4'-DDT	0.0075 J	4	Arsenic	54.0	Arsenic	54.0	10	173	15.1
		Arsenic	54.0		Barium	3,330	Barium	3,330	2000		107
					Nickel	83.2					
Q-50	0E+00			0.2							

TABLE 5-2

SUMMARY OF THE COMPARISON OF ANALYTICAL RESULTS WITH THE CLEAN-UP ACTION LEVELS (1,2,3)
MIDCO II SITE, GARY, INDIANA

Monitoring Location	Carcinogenic Risk (4) Total	Contributing Parameters	Concentration (μg/L)	Noncarcinogenic Risk (4) Total	Contributing Parameters	Concentration (μg/L)	Parameters at or Above MCL or AWQC Parameter	Concentration (μg/L)	MCL (μg/L)	AWQC (μg/L)	Background Concentration (5) (μg/L)
R-10 (6)	8E-04	Benzene	110 J	28	Acetone	2,200 J	cis-1,2-Dichloroethene	2,800	70		
		Tetrachloroethene	190 J		1,1-Dichloroethane	310 J	1,1,1-Trichloroethane	700	200		
					1,1,1-Trichloroethane	700	Benzene	110 J	5		0.04
					4-Methyl-2-Pentanone	770 J	Tetrachloroethene	190 J	5		
					Tetrachloroethene	190 J	Toluene	43,000	1,000		
					Toluene	43,000	Ethyl Benzene	13,000	700		
					Ethyl Benzene	13,000	Xylenes (Total)	39,000	10,000		
					Xylenes (Total)	39,000	Iron	23,200		3,600	15,300
					2-Methylphenol	350					
					4-Methylphenol	260					
					2,4-Dichlorophenol	38					
R-50R (6)	1E-03	Benzene	4.4 J	2	Acetone	410 J	Arsenic	19.8	10	173	15.1
		Arsenic	19.8		4-Methyl-2-pentanone	990 J					
					Arsenic	19.8					
					Barium	562					
S-10	1E-03	Benzene	0.48 J	3	Antimony	2.1 J	Arsenic	20.5	10	173	15.1
		Arsenic	20.5		Arsenic	20.5	Selenium	63.6 J	50	126	
					Selenium	63.6 J					
					Vanadium	256					
S-50	5E-03	1,1-Dichloroethene	0.091 J	3	Antimony	2.7 J	Arsenic	92.3	10	173	15.1
		Arsenic	92.3		Arsenic	92.3					
					Barium	489					
T-10	1E-06			0.4			Iron	16,000		3,600	15,300
T-50	4E-03	1,1-Dichloroethene	4.2 J	8	Acetone	2,700 J	Arsenic	62.7	10	173	15.1
		Arsenic	62.7		2-Butanone	440	Barium	5,680	2,000		107
					Antimony	2.9 J	Iron	30,400		3,600	15,300
					Arsenic	62.7					
					Barium	5,680					
					Nickel	138					
U-10	2E-03	Benzene	2.6	1	Antimony	2.3 J	Arsenic	33.8	10	173	15.1
		Arsenic	33.8		Arsenic	33.8	Iron	22,300		3,600	15,300
					Manganese	844					
U-50	4E-03	alpha-Chlordane	0.022	3	Antimony	2.7 J	Arsenic	65.9	10	173	15.1
		Arsenic	65.9		Arsenic	65.9	Iron	43,600		3,600	15,300
					Barium	493					
V-10	7E-05	1,1,2,2-Tetrachloroethane	2.6	0.9			Iron	25,400		3,600	15,300
		alpha-Chlordane	0.0066 J								
V-50	3E-03	(7)		3	Antimony	3.0 J	Arsenic	64.4	10	173	15.1
					Arsenic	64.4	Iron	35,300		3,600	15,300
					Barium	761					

TABLE 5-2

SUMMARY OF THE COMPARISON OF ANALYTICAL RESULTS WITH THE CLEAN-UP ACTION LEVELS (1,2,3)
MIDCO II SITE, GARY, INDIANA

Monitoring Location	Carcinogenic Risk (4) Total	Contributing Parameters	Concentration (µg/L)	Noncarcinogenic Risk (4) Total	Contributing Parameters	Concentration (µg/L)	Parameters at or Above MCL or AWQC Parameter	Concentration (µg/L)	MCL (µg/L)	AWQC (µg/L)	Background Concentration (5) (µg/L)
P-1	3E-03	4,4'-DDT	0.010 J	2	Antimony	1.6 J	Arsenic	58.5	10	173	15.1
		Arsenic	58.5		Arsenic	58.5					
					Barium	396					
P-2	2E-03	4,4'-DDT	0.010 J	1	Arsenic	36.3	Arsenic	36.3	10	173	15.1
		Arsenic	36.3		Manganese	556					
P-3	2E-03	alpha-Chlordane	0.0059 J	2	Arsenic	32.1	Arsenic	32.1	10	173	15.1
		Arsenic	32.1		Barium	1,520	Iron	24,900		3,600	15,300
					Nickel	69.0					

Key:
µg/l = Micrograms per liter
MCL = Maximum Contaminant Level. MCL's were obtained from 40 CFR Sec. 141
AWQC = Aquatic Water Quality Criteria. Obtained from Table 2 of Attachment 2 of the Statement of Work
J = The concentration is approximate due to limitations identified during the quality assurance review
CFR = Code of Federal Regulations

(1) All parameters detected below the background concentrations were not considered, as established in Attachment 2 of the Statement of Work.
(2) The complete validated data tables and risk calculation tables are included in Appendices F and G, respectively.
(3) The quantitation limits for thallium at all locations except for F-10 and U-10, were above their respective Clean-up Action Levels, as indicated in Table 5-3.
(4) Parameters are shown only if the cumulative risks for the location are above the acceptable carcinogenic risk of 1E-05 or above the acceptable noncarcinogenic risk of 1, and:
- Parameters produce individual carcinogenic risks above 1E-05, or they produce individual carcinogenic risks higher than 1E-06 and their sum produces a cumulative carcinogenic risk above 1E-05; or
- Parameters produce individual noncarcinogenic risks above 1, or (for parameters with the same effects) they produce individual noncarcinogenic risks above 0.1 and their sum produces a cumulative noncarcinogenic risk above 1.

Parameters are shown in order of risk produced for the risk columns and in the order shown in Table 5-1 for the comparison with the MCLs and AWQCs.
(5) The background concentrations were obtained from Table 1 of Attachment 2 of the Midco I and II Statement of Work, dated June 1992.
(6) This location had parameters, excluding dibenzo(a,h)anthracene, dieldrin and thallium, with quantitation limits above their respective Clean up Action Levels, as indicated in Table 5-3.
(7) The carcinogenic or noncarcinogenic risk calculated for this location is above 1E-05 or 1, but it is produced by a single analyte for which an MCL has been promulgated (the list of parameters per sampling locations and risk type is included in Appendix B). In accordance to Attachment 2 of the Statement of Work, the analyte should not be included in the risk calculation, and its clean-up action level should be the corresponding MCL or AWQC, whichever is lower.
(8) See Table B-2 in Appendix B.
(9) The MCL is for total chromium and the AWQC is for trivalent chromium. The value detected is the result for total chromium.

TABLE 5-2

SUMMARY OF THE COMPARISON OF ANALYTICAL RESULTS WITH THE CLEAN-UP ACTION LEVELS[1,2]
MIDCO II SITE
GARY, INDIANA

Monitoring Location	Carcinogenic Risk[3] Total	Carcinogenic Risk[3] Contributing Parameters	Carcinogenic Risk[3] Concentration µg/L	Noncarcinogenic Risk[3] Total	Noncarcinogenic Risk[3] Contributing Parameters	Noncarcinogenic Risk[3] Concentration µg/L	Parameters at or Above MCL or AWQC: Parameter	Concentration µg/L	MCL µg/L	AWQC µg/L	Background Concentration[4] µg/L	Exceeds CALs
D-30 [5]	3E-03	Arsenic	46.6	2	Arsenic	46.6	Benzene	9.8	5		0.04	Yes
		Benzene	9.8		Barium	109 J	Arsenic	46.6	10	173	15.1	
					Manganese	471						
					Vanadium	10.5						
					Cadmium	0.94 J						
					Nickel	12.5 J						
					Ethyl Benzene	42						
					Chromium	21						
					Toluene	0.73 J						
E-10R	1E-06			0.46								No
E-50R	2E-03	Aresenic[6]	31.5	1	Arsenic	31.5	Arsenic	31.5	10	173	15.1	Yes
					Barium	460	Cyanide	77.6 J	200	18.7	158	
					Xylenes	2.3						
					Ethylbenzene	0.70						
					Toluene	0.36 J						
F-10 [5]	1E-05	Methylene Chloride[6]	8.6 J	0.65			Methylene Chloride	8.6 J	5		1.9	Yes
							Cyanide	63.4	200	18.7	158	
F-30 [5]	2E-03	Arsenic	31.1	4	4-Methyl-2-pentanone	3,900	Methylene Chloride	50	5		1.9	Yes
		Methylene Chloride	50		Arsenic	31.1	Arsenic	31.1	10	173	15.1	
					Barium	795 J	Cyanide	21.6	200	18.7	158	
					Acetone	690						
					Methylene Chloride	50						
					Nickel	17.3 J						
G-10	1E-06			0.1			Copper	231		120	25.2	Yes
G-30	2E-03	Aresenic[6]	38.4	2	Arsenic	38.4	Arsenic	38.4	10	173	15.1	Yes
					Barium	1,540						
					Nickel	20.9 J						
					4-Methyl-2-pentanone	28						
H-10	0E+00			0.6			Antimony	6.5 J	6			Yes
H-30	2E-03	Aresenic[6]	35.4	4	Thallium	4.2 J	Arsenic	35.4	10	173	15.1	Yes
					Arsenic	35.4	Thallium	4.2 J	2	144		
					Barium	1,520 J						
					Cadmium	1.1 J						
					Nickel	14.8 J						
					Vanadium	1.1 J						
N-10	1E-03	Aresenic[6]	24.9	0.87			Arsenic	24.9	10	173	15.1	Yes
							Iron	17,300		3,600	15,300	
N-50	5E-03	Aresenic[6]	89.8	7	Thallium	8.6 J	Arsenic	89.8 J	10	173	15.1	Yes
					Arsenic	89.8 J	Iron	30,900		3,600	15,300	
					Barium	321 J	Thallium	8.6 J	2	144		
					Nickel	17.9 J	Cyanide	46.4	200	19	158	
					Vanadium	1.2 J						

TABLE 5-2

SUMMARY OF THE COMPARISON OF ANALYTICAL RESULTS WITH THE CLEAN-UP ACTION LEVELS[1,2]
MIDCO II SITE
GARY, INDIANA

Monitoring Location	Carcinogenic Risk[3] Total	Carcinogenic Risk[3] Contributing Parameters	Carcinogenic Risk[3] Concentration µg/L	Noncarcinogenic Risk[3] Total	Noncarcinogenic Risk[3] Contributing Parameters	Noncarcinogenic Risk[3] Concentration µg/L	Parameters at or Above MCL or AWQC: Parameter	Concentration µg/L	MCL µg/L	AWQC µg/L	Background Concentration[4] µg/L	Exceeds CALs
MW-1	3E-05	Trichloroethene	19	0 48			Cyanide	211	200	18 7	158	Yes
		Tetrachloroethene	1 9				Trichloroethene	19	5			
MW-50	3E-03	Aresenic[6]	57 4	12	Thallium	13.5	Arsenic	57 4	10	173	15.1	Yes
					Barium	6,770 J	Barium	6,770 J	2,000		107	
					Arsenic	57 4	Iron	44,000		3,600	15,300	
							Thallium	13.5	2	144		
MW-2S	0E+00			0 0			Cyanide	21.9	200	18.7	158	No
MW-2D	2E-03	Aresenic[6]	42.4	1 5	Arsenic	42.4	Arsenic	42.4	10	173	15 1	Yes
					Barium	295 J	Cyanide	20 8	200	18.7	158	
MW-3S	0E+00			0.4			Cyanide	22 8	200	18.7	158	No
MW-3D	4E-03	Aresenic[6]	72.6	8	Thallium	12 7	Arsenic	72.6	10	173	15.1	Yes
					Arsenic	72.6	Iron	44,300		3,600	15,300	
					Barium	687 J	Thallium	12.7	2	144		
					Chromium (VI)	14 0	Cyanide	29 1	200	18.7		
					Nickel	15 9 J						
MW-4SR	0E+00			0.17			Cyanide	55.9 J	200	18 7	158	No
MW-4D[5]	5E-03	Arsenic	87.9	10	2-Butanone	2,800 J	Arsenic	87 9	10	173	15 1	Yes
		Methylene Chloride	32 J		Arsenic	88	Methylene Chloride	32 J	5		1 9	
		Benzene	0.76 J		Acetone	3,500 J						
					4-Methyl-2-pentanone	1,100 J						
					Barium	1,100 J						
					Vanadium	4 2 J						
					Methylene Chloride	32 0 J						
					Nickel	350						
B-10	3E-03	Arsenic	48.5	2	Arsenic	48 5	Arsenic	48 5	10	173	15 1	Yes
		Benzene	0 12 J		Manganese	1,220						
					Cadmium	1 7 J						
					Chlorobenzene	0.12 J						
B-30	3E-03	Aresenic[6]	48 7	2	Arsenic	48.7	Arsenic	48.7	10	173	15 1	Yes
					Barium	1,330						
					Cadmium	1.8 J						
					Chromium (VI)	7.9 J						
					4-Methyl-2-pentanone	4 2 J						
C-10[5]	0E+00			0.13								No
C-30	3E-03	Aresenic[6]	60.60	2	Arsenic	60.6	Arsenic	60.6	10	173	15.1	Yes
					Barium	543 J						
					Nickel	15.8 J						
					Vanadium	0.97 J						
					4-Methyl-2-pentanone	2 1 J						
D-10[5]	2E-04	Benzene	56	0 3			Benzene	56	5		0.04	Yes
		Methylene Chloride	8 7 J				Methylene Chloride	8 7 J	5		1 9	

TABLE 5-2

SUMMARY OF THE COMPARISON OF ANALYTICAL RESULTS WITH THE CLEAN-UP ACTION LEVELS[1,2]
MIDCO II SITE
GARY, INDIANA

Monitoring Location	Carcinogenic Risk[3] Total	Contributing Parameters	Concentration µg/L	Noncarcinogenic Risk[3] Total	Contributing Parameters	Concentration µg/L	Parameters at or Above MCL or AWQC: Parameter	Concentration µg/L	MCL µg/L	AWQC µg/L	Background Concentration[4] µg/L	Exceeds CALs
P-10	0E+00			0.48								No
P-50	4E-03	Aresenic[6]	78.3	3	Arsenic	78.3	Arsenic	78.3	10	173	15.1	Yes
					Barium	227	Iron	30,300 J		3,600	15,300	
					Vanadium	8.6 J						
					Nickel	13.6 J						
Q-10	0E+00			0.3								No
Q-50	3E-03	Aresenic[6]	56.2	3	Arsenic	56.2	Arsenic	56.2	10	173	15.1	Yes
					Barium	1,800 J						
					Nickel	33.5 J						
					Vanadium	4.3 J						
R-10[5]	8E-05	Methylene Chloride[6]	49 J	4	Xylenes	4,700	cis-1,2-Dichloroethene	200	70			Yes
					Toluene	5,300	Toluene	5,300	1,000			
					Ethylbenzene	1,600	Mercury	0.40	2	0.04		
					Antimony	4.7 J	Methylene Chloride	49 J	5		0.25	
					Manganese	1,760	Cyanide	90.2 J	200	18.7	2	
					Barium	207					158	
					Nickel	55.4						
					1,1,1-Trichloroethane	80 J						
					Mercury	0.4						
					Methylene Chloride	49.0 J						
					Chromium	20.0						
R-50R[5]	2E-05	Benzene	4.4	0.29								Yes
		1,2-Dichloropropane	2.9									
S-10	1E-03	Aresenic[6]	25.60	3	Vanadium	295	Antimony	10.7	6			Yes
					Antimony	10.7	Arsenic	25.6	10	173	15.1	
					Arsenic	25.6						
					Selenium	37.6						
					Chromium (VI)	14.0						
					Chromium	12.0						
S-50	4E-03	Aresenic[6]	72.8	2	Arsenic	72.8	Arsenic	72.8	10	173	15.1	Yes
					Barium	130 J						
T-10	1E-03	Aresenic[6]	23.2	0.86			Arsenic	23.2	10	173	15	Yes
T-50	3E-03	Aresenic[6]	54.8	2	Arsenic	54.8	Arsenic	54.8	10	173	15.1	Yes
					Barium	1,090	Iron	15,600		3,600	15,300	
					Cadmium	1.2 J	Cyanide	32.2 J	200	18.7	158	
					4-Methyl-2-pentanone	27.0						

TABLE 5-2

SUMMARY OF THE COMPARISON OF ANALYTICAL RESULTS WITH THE CLEAN-UP ACTION LEVELS[1,2]
MIDCO II SITE
GARY, INDIANA

Monitoring Location	Carcinogenic Risk[3] Total	Contributing Parameters	Concentration µg/L	Noncarcinogenic Risk[3] Total	Contributing Parameters	Concentration µg/L	Parameters at or Above MCL or AWQC Parameter	Concentration µg/L	MCL µg/L	AWQC µg/L	Background Concentration[4] µg/L	Exceeds CALs
U-10	1E-03	Aresenic[6]	17.9	1 0	Arsenic	17 9	Arsenic	17.9	10	173	15.1	Yes
					Manganese	2,750 J	Iron	17,900		3,600	15,300	
					Xylenes (Total)	25						
					Toluene	14						
					2-Butanone	1.60 J						
					Vanadium	0.54 J						
					Ethylbenzene	3 00						
U-50	3E-03	Aresenic[6]	61.2	5	Thallium	7.4 J	Arsenic	61 2	10	173	15 1	Yes
					Arsenic	61 2	Iron	36,300		3,600	15,300	
					Barium	533 J	Thallium	7.4 J	2	144		
							Cyanide	51.1	200	18.7	158	
V-10	0E+00			0.00								No
V-50	4E-03	Aresenic[6]	77.3	3	Arsenic	77 3	Arsenic	77.3	10	173	15 1	Yes
					Barium	460	Iron	18,800 J		3,600	15,300	
P-1	0E+00			0 24								No
P-2	8E-04	Aresenic[6]	15.3	0 53			Arsenic	15 3	10	173	15 1	Yes
P-3	0E+00			0.00								No

Notes:

µg/L = Micrograms per liter
MCL = Maximum Contaminant Level
AWQC = Ambient Water Quality Criteria
J = The concentration is approximate.

[1] All parameters detected below the background concentrations were not considered, as established in Attachment 2 of the Statement of Work.

[2] The complete validated data tables and risk calculation tables are included in Appendices G and H, respectively

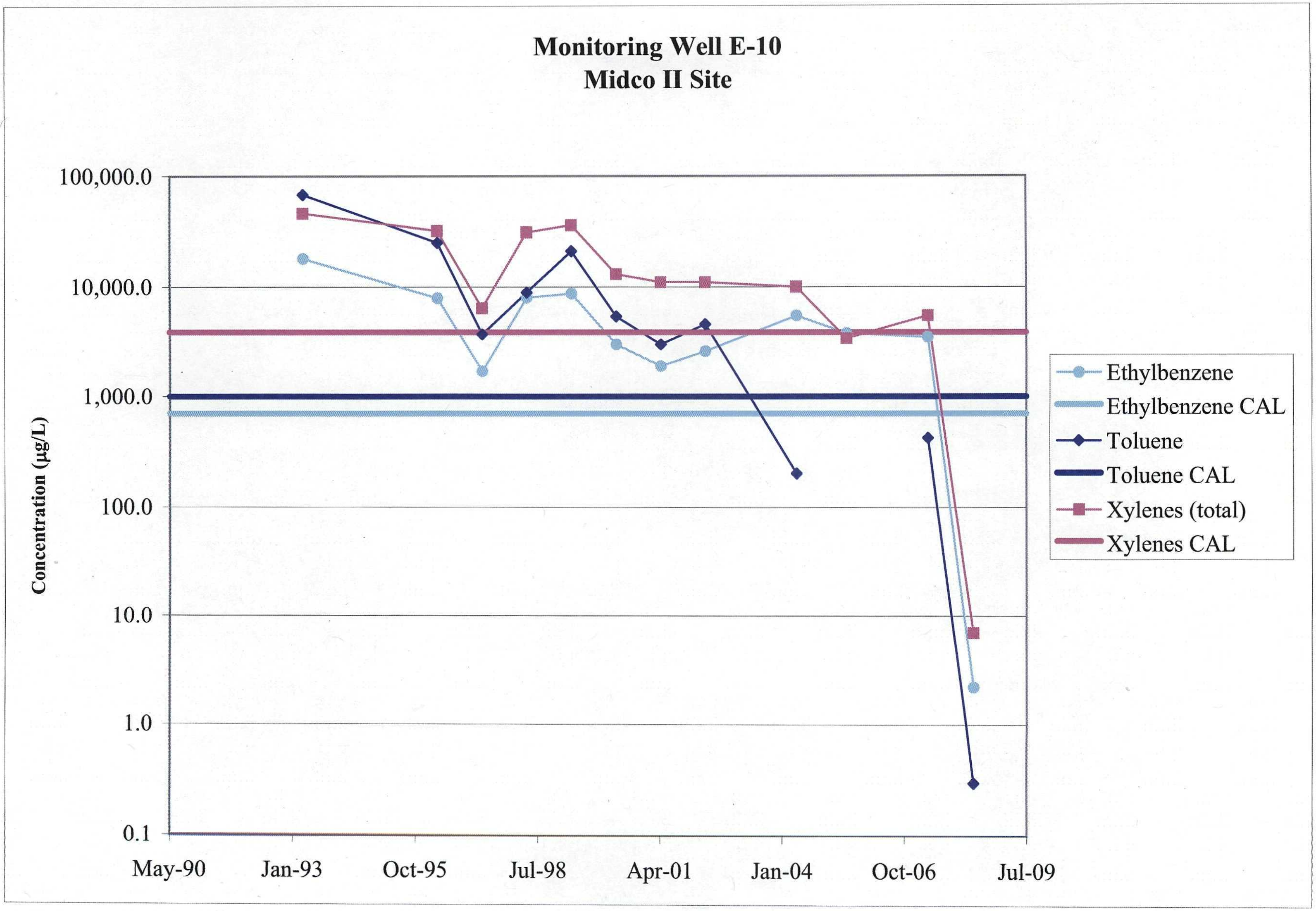
[3] Parameters are shown only if the cumulative risks for the location are above the acceptable carcinogenic risk of 1E-05 or above the acceptable noncarcinogenic risk of 1, and
- Parameters produce individual carcinogenic risks above 1E-05, or they produce individual carcinogenic risks higher than 1E-06 and their sum produces a cumulative carcinogenic risk above 1E-05, or
- Parameters produce individual noncarcinogenic risks above 1, or (for parameters with the same effects) they produce a cumulative noncarcinogenic risk above 1 (refer to Appendix B).

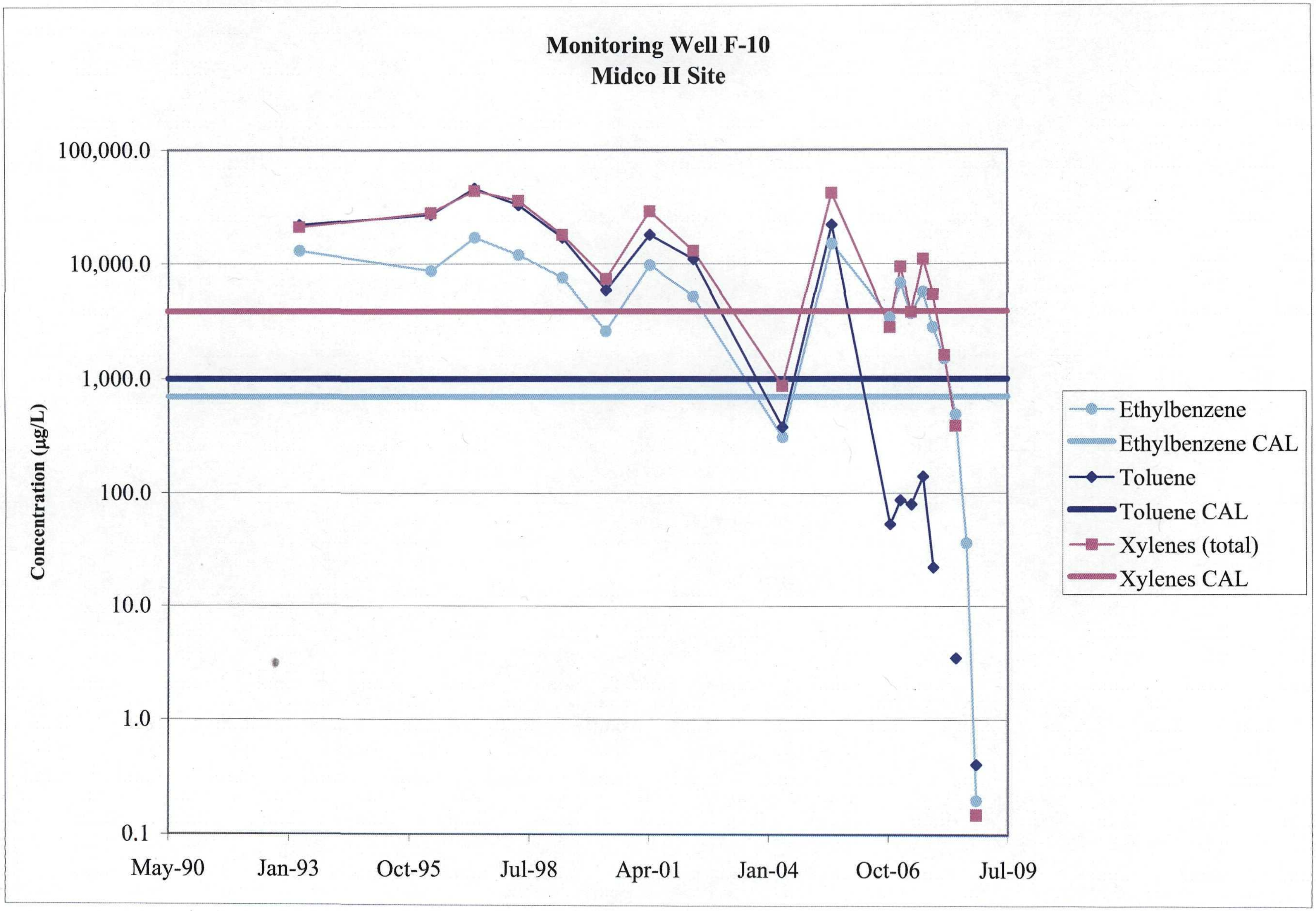
Parameters are shown in order of risk produced for the risk columns and in the order shown in Table 5-1 for the comparison with the MCLs and AWQCs.

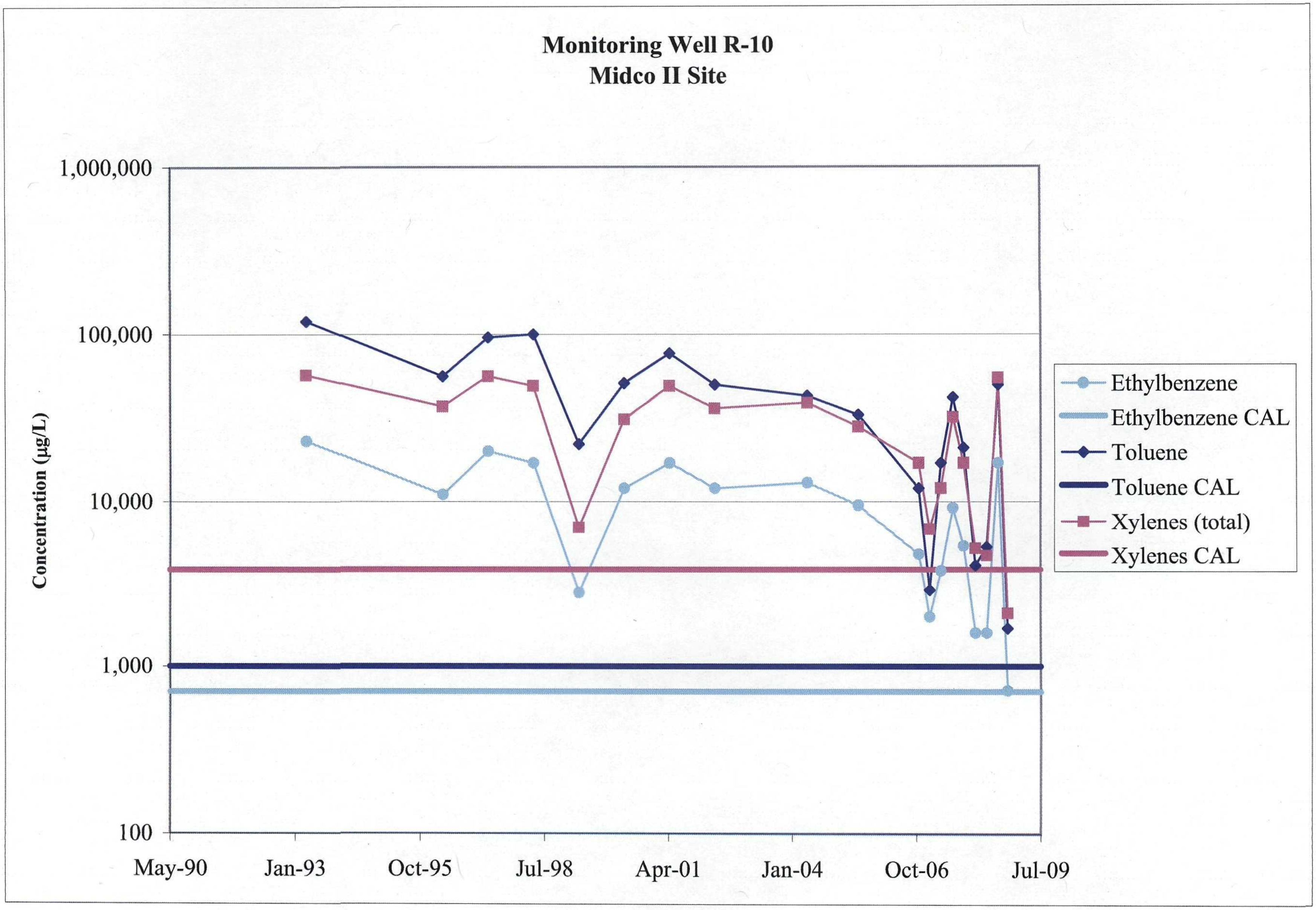
[4] The background concentrations were obtained from Table 1 of Attachment 2 of the Midco I and II Statement of Work, dated June 1992.

[5] This location had parameters, excluding thallium, with quantitation limits above their respective Clean up Action Levels, as indicated in Table 5-3 The quantitation limits for thallium at nearly all locations were above their respective Clean-up Action Levels as indicated in Table 5-3.

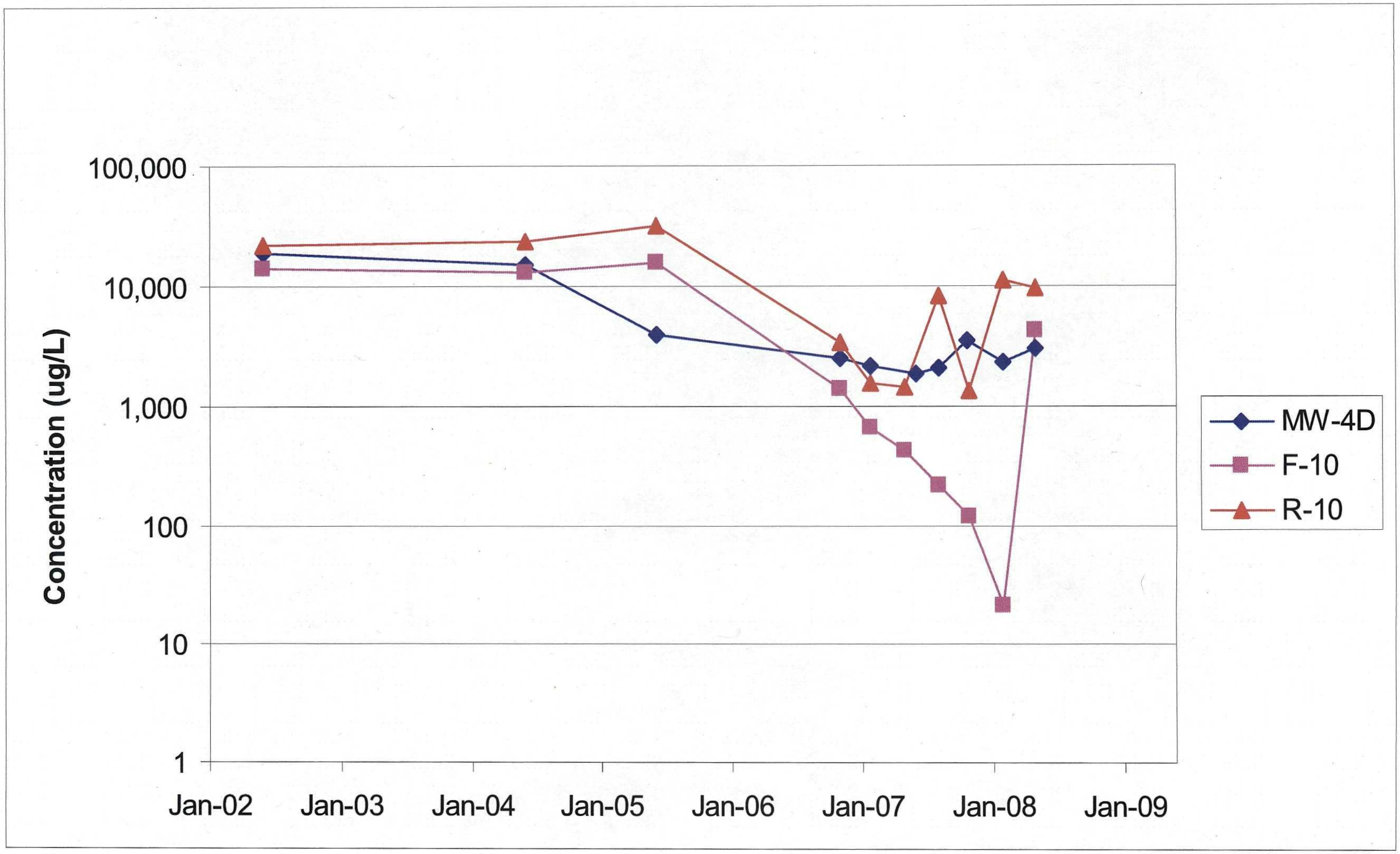
[6] The carcinogenic or noncarcinogenic risk calculated for this location is above 1E-05 or 1, but it is produced by a single analyte for which an MCL has been promulgated (the list of parameters per sampling locations and risk type is included in Appendix C) In accordance to Attachment 2 of the Statement of Work, the analyte should not be included in the risk calculation, and its clean-up action level should be the corresponding MCL or AWQC, whichever is lower.


Monitoring Well E-10
Midco II Site
Concentration (µg/L)
100,000.0
10,000.0
1,000.0
100.0
10.0
1.0
0.1
May-90
Jan-93
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Ethylbenzene
Ethylbenzene CAL
Toluene
Toluene CAL
Xylenes (total)
Xylenes CAL


Monitoring Well F-10
Midco II Site
Concentration (µg/L)
100,000.0
10,000.0
1,000.0
100.0
10.0
1.0
0.1
May-90
Jan-93
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Ethylbenzene
Ethylbenzene CAL
Toluene
Toluene CAL
Xylenes (total)
Xylenes CAL



Monitoring Well R-10
Midco II Site
1,000,000
100,000
10,000
1,000
100
Concentration (µg/L)
May-90
Jan-93
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Ethylbenzene
Ethylbenzene CAL
Toluene
Toluene CAL
Xylenes (total)
Xylenes CAL



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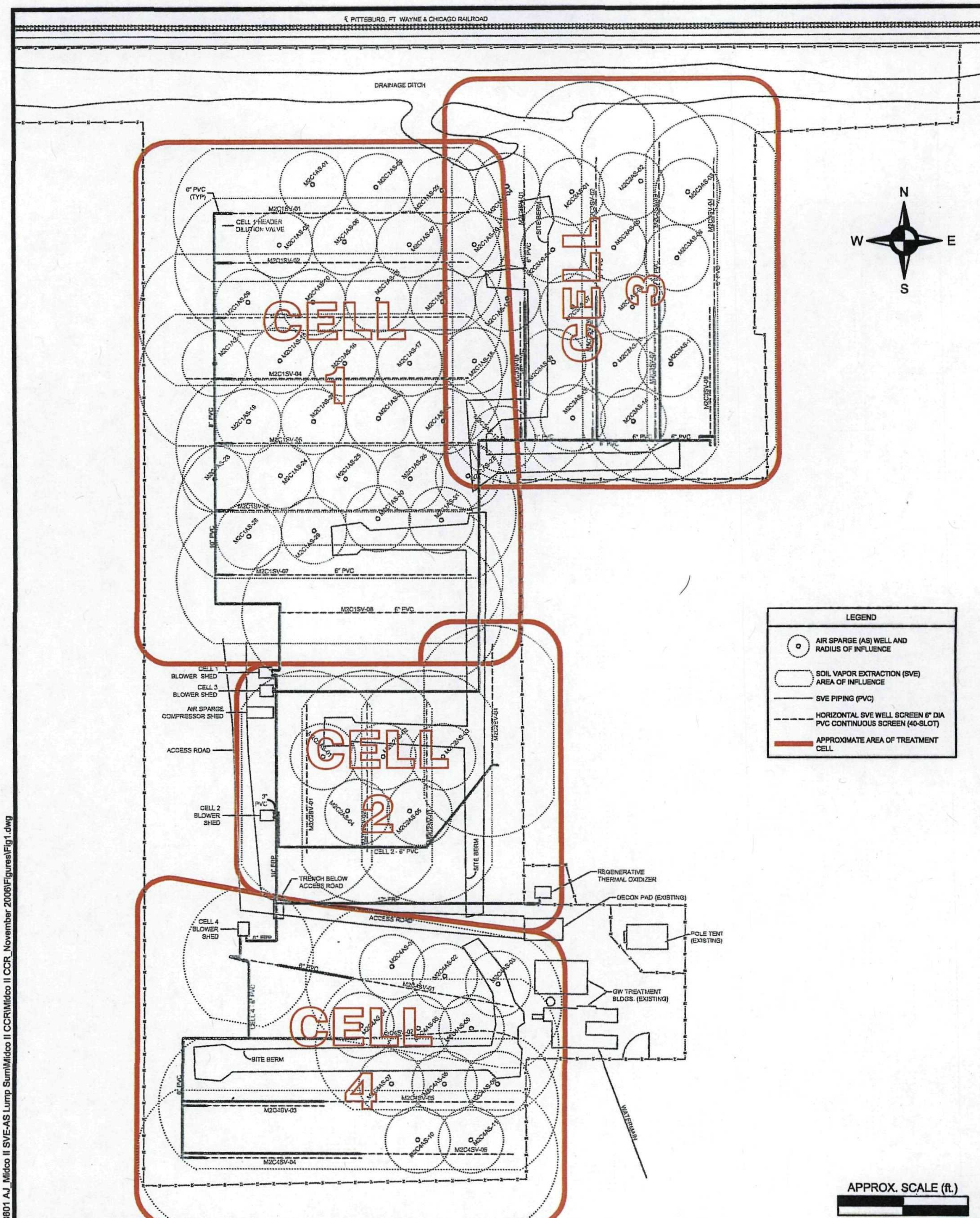
ENVIRON	TOTAL IRON CONCENTRATIONS - MONITORING WELLS MW-4D, F-10, AND R-10 MIDCO II SITE GARY, INDIANA	Figure 15

Drafter: APR Date: 09/26/08 Contract Number: 21-17680H Approved: Revised:



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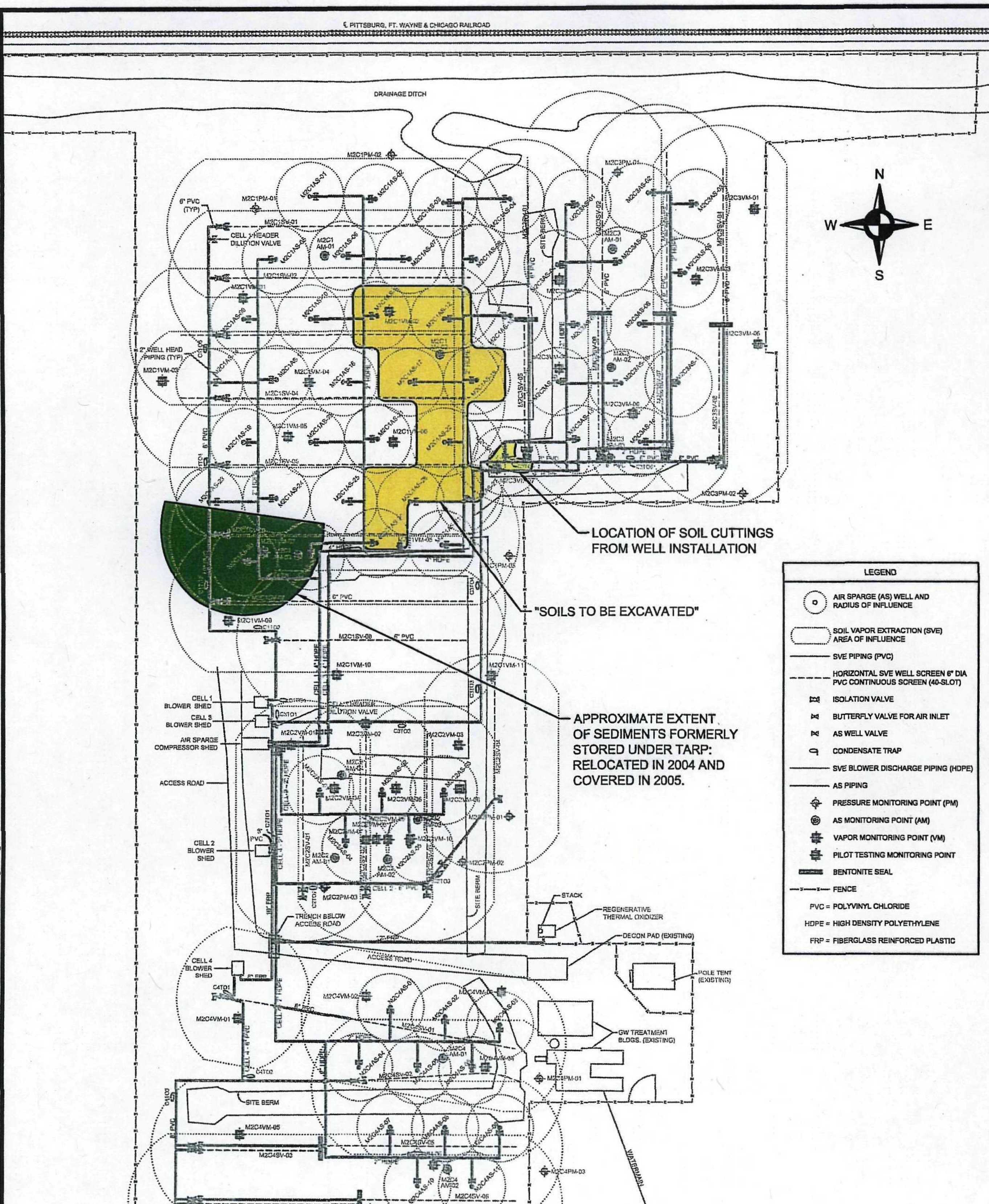
ENVIRON	SVE/AS TREATMENT CELLS MIDCO II SITE GARY, INDIANA	Figure 1

Drafter: APR | Date: 05/31/06 | Contract Number: 21-8601AJ | Approved: | Revised:



ENVIRON

LOCATIONS OF TARP SEDIMENTS, WELL SOIL CUTTINGS, AND "SOILS TO BE EXCAVATED"
MIDCO II SITE
GARY, INDIANA

Figure 3

Drafter: APR | Date: 05/31/06 | Contract Number: 21-8601AJ | Approved: | Revised:

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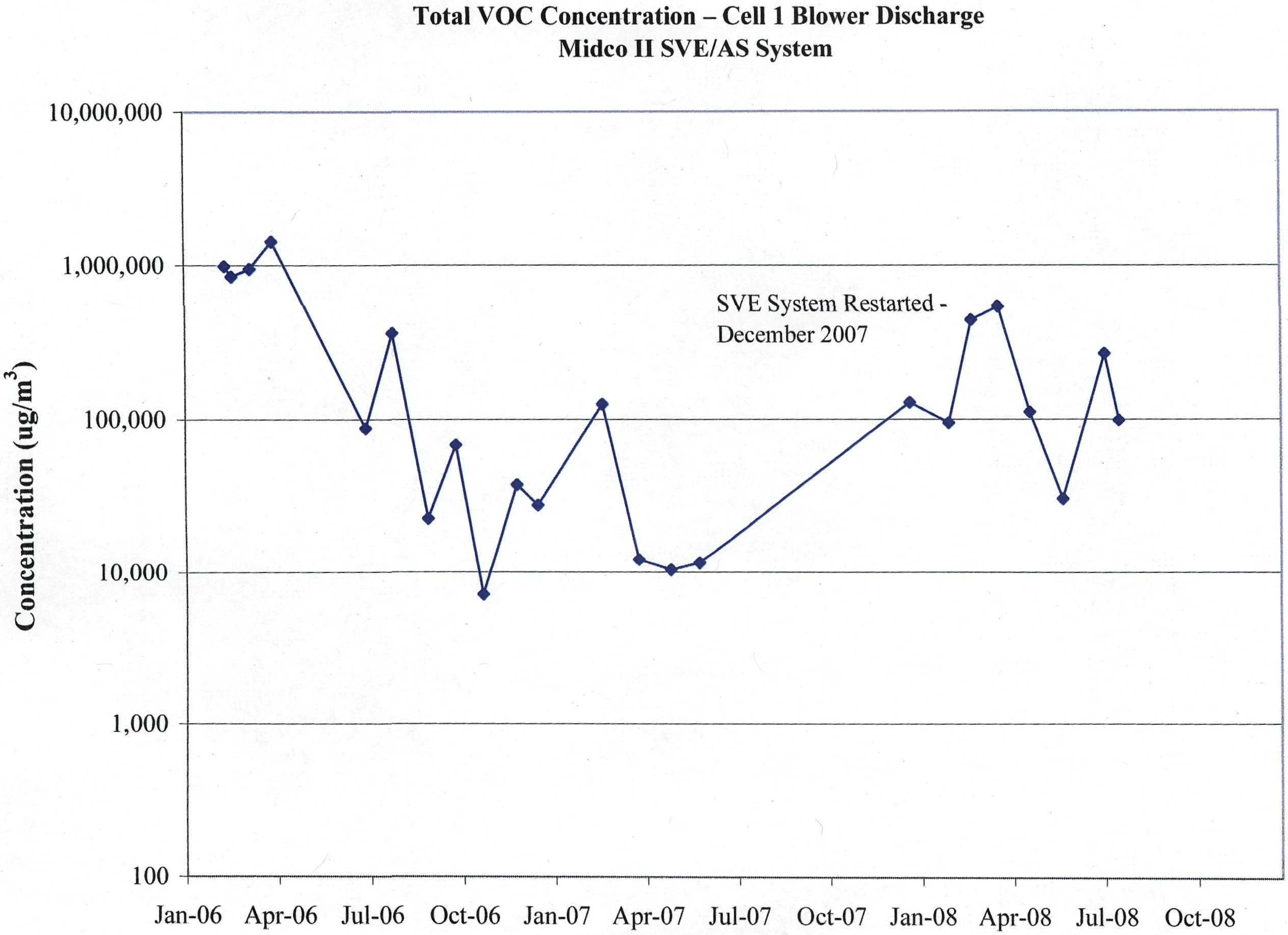
APPENDICES

FIGURE 1



Note: Data for the different operational configurations are presented together on this graph.

Better hope Palin doesn't answer that 3 a.m. call

RICHARD COHEN

"It seems to me that Senator Obama would rather lose a war in order to win a political campaign." So said John McCain about Barack Obama. Now, with much more credibility, Obama could say the same thing about McCain.

Regardless of how he might extol Sarah Palin — smart, attractive, zealous reformer — she is nonetheless eminently unqualified to be president of the United States. That 3 a.m. call had better be a wrong number.

As nature abhors a vacuum, so does McCain abhor predictability. He is not just the maverick everyone says he is — he is the ageless bad boy. The glee on his face as he introduced his running mate said it all. He looked like an old guy who had just come into a nightclub with some dishy arm candy: get a load of this! Only the "this" was not some ditsy woman, but a governor who handled herself with aplomb and confidence. She was a hit.

McCain has earned the right to looked pleased. In picking Palin, he reminded us that he himself is a reformer. At the very least, this is how he likes to see himself. He wages war against entitlements, against busted budgets, against lobbyists. He abhorred Sen. Ted Stevens' earmark for the notorious Bridge to Nowhere — and then when the money came through, Palin killed the project. So this ticket is in agreement on government waste. They hate it.

It is always important to remember about John McCain that he graduated way down in his class at the Naval Academy. That wasn't because McCain is dumb or because he is lazy. It was because he had a hard time with rules. You tell him to do something — even study hard — and something in him recoils. This rebellious streak, which he has called juvenile and which he now says he regrets, almost cost him his life in that North Vietnamese prison camp. His jailors told him what he should do; he told them what they could do.

This streak persists. Sarah Palin is a product of it. Pundits will read all sorts of reasons into the choice of Palin — the politics of it all — and they will be right. Palin's a woman. Palin's anti-abortion. Palin's a gun owner. Palin is a mother and a wife and, of course, the governor of Alaska. She is, significantly, a woman of deep conviction and a formidable person. She is hardly without achievement.

But one line in the McCain campaign's announcement on Palin jumps out: "As the head of Alaska's National Guard and as the mother of a soldier herself, Governor Palin understands what it takes to lead our nation and she understands the importance of supporting our troops." Now, that's just plain silly. She is only the titular leader of the guard — all governors are. And if that is what it takes to be commander in chief, then I should be secretary of defense. I was in the National Guard — nothing titular about it. The mere fact that the McCain campaign had to mention this is testament to the thinness of her resume.

The elephant in the room when it comes to McCain is his age. He is now 72, which is not old — not *that* old anyway. But it is not young and he has had skin cancer. John Glenn, a former Marine fighter pilot and fit as the proverbial fiddle, rode a rocket into space — and then had to abandon his first political race when he had an accident in the bathtub. Life happens and it can happen to the young and the fit as well as the old. You want to make God laugh? Tell him your plans.

So a person — any person — has to entertain a certain prudent terror for the unexpected. This is particularly the case for a man of 72. He confronts — if only on the bedroom ceiling on those nights when sleep does not come — the fact that death has sneaked into the suburbs of his life. How did this happen? "Where has the time all gone to?" asked Betty Comden and Adolph Green in their lyric for Leonard Bernstein's "Some Other Time." Now, wills have to be drawn up, papers signed, provisions made.

The will of a president is the person he has chosen to be his vice president. John McCain, for political and personal reasons, has left the United States of America to Sarah Palin. At this moment, she seems shockingly undeserving.

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Palin pumps life into stagnant Grand Old Party

KATHLEEN PARKER

When Sarah Palin took the stage Wednesday night, the reaction of conventioneers went beyond mere appreciation. It was gratitude.

And relief that the first Republican woman on a presidential ticket wasn't going to let them down. No one was going to be embarrassed by John McCain's maverick pick.

Several days of brutal scrutiny leading up to her acceptance speech had given them cause to wonder. Ethics questions about her possible involvement in trying to get a former brother-in-law fired are legitimate. So are critiques of her performance as a self-professed tax-cutter and government reformer. But attacks on her family have been blistering and over the top.

Thus, much of the off-mic talk in St. Paul the past few days centered on whether she was up to the fight. Would she be able to make it through? Would she crumble? Did Palin have the stuff to withstand the bludgeoning scrutiny?

Awaiting her performance reminded me of the day 13 years ago when Shannon Faulkner became the first female cadet at South Carolina's The Citadel. Agree or not with the politics that propelled her there, women wanted her to be at least competent. To be fit. To make them proud.

We know the history of that disappointment. I suspect even many Democrats would confess to a private hope that Palin would do well. There aren't enough women in high places yet for us to enjoy a first-woman's stumble, no matter what the arena.

She has given (voters) the very thing Democrats have been enjoying the past several months: hope and change.

Palin delivered.

What she showed was strength, conviction, determination, confidence, a willingness to rumble and fearlessness. No caribou caught in the headlights, she.

Whatever conclusions the punditry might draw from Palin's remarks, we can be fairly certain that Middle America felt nothing but redemption and salvation. Dozens of e-mails in my inbox confirm as much. "Pumped" is the word I keep hearing.

Palin's role in this election is as groundbreaking as Barack Obama's for the obvious reasons. Both have validated the best instincts of their parties and our nation. But there's more. Both also seem to be filling a need that isn't specifically about leadership or qualifications for office.

When Obama fills a stadium with tens of thousands of admirers, you can be sure that part of the draw is the audience's sense of being part of something new and extraordinary. They want to be part of the Next New Thing, and people feel elevated in his presence.

Similarly, when Palin brought Republican conventioneers to their feet, they weren't just applauding their vice presidential nominee, they were applauding themselves. They were proud of her, sure, *but they were also proud of* themselves. Why, they had nominated a woman!

It is delightful to feel good about oneself, and Palin delivered energy where spirits had flagged and inspired a vision that had become blurred.

Glancing around the convention center in St. Paul, it was not hard to see that the GOP is in dire need of a transfusion. I've been to retirement villages that had fewer gray hairs and to Old South parties that were more diverse. For whatever reason, the Republican Party has not been able to attract young people or minorities in numbers that reflect the mainstream America it purports to represent.

Is it the message or the messenger? Both — and Republicans know it. Behind closed doors around the Twin Cities talk focused on the need for new templates, new models. Republicans have to communicate that they, too, care about *the issues Democrats have* claimed as their own — education, health and the environment. They need new ideas and new — younger — faces to *deliver the message.*

Voila. Enter Palin.

Some have criticized McCain for cynically selecting a woman only to try to attract former Hillary Clinton supporters. Obviously, there's some truth to that. Being a woman is part of Palin's appeal, and running mates are often picked in hopes of securing a particular state or demographic.

But Palin brings more to the ticket than the possibility of a few female voters. She has animated voters who had little enthusiasm for the race. She has given them the very thing Democrats have been enjoying the past several months: hope and change.

That's potent medicine. It also should come with a warning label: "May cause delusions *and a false sense of power.*"

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U.S. ENVIRONMENTAL PROTECTION AGENCY
REMEDIAL ACTION

ADMINISTRATIVE RECORD
FOR
MIDCO II SITE
GARY, INDIANA

UPDATE #6
FEBRUARY 18, 2009

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1	03/07/89	Environmental Resources Management-North Central, Inc.	Midco Trustees	Addendum to Public Comment Feasibility Study for the Midco I Site	
2	09/27/96	Hutchens, R., ERM-North Central, Inc.	Boice, R., U.S. EPA	Letter re: Soil Gas Analytical Data with Revised Location Diagrams for the Midco I and II Sites	
3	09/09/97	Hutchens, R., Environmental Resources Management	Boice, R., U.S. EPA	Letter re: Semiannual Soil Gas and Monitoring Well Sampling Results for the Midco I and II Sites	
4	09/00/98	Environmental Resources Management	U.S. EPA	Soil Sampling Report for the Midco II Site	
5	05/06/04	Boice, R., U.S. EPA	Hutchens, R., ENVIRON	Letter re: Inspection of Operation and Maintenance of Groundwater Pump and Treat Systems at the Midco I and Midco II Sites w/Attachment	5
6	05/07/04	Boice, R., U.S. EPA	Hutchens, R., ENVIRON	Letter re: Approval of the Revised Standard Operating Procedure for Sulfide Analysis at the Midco I and II Sites w/Attachment	2
7	05/26/04	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Letter re: Response to U.S. EPA's May 6, 2004 Letter Concerning Operation and Maintenance at the Midco I and Midco II Site	
8	06/08/04	Moran, F. & R. Hutchens, ENVIRON	Boice, R., U.S. EPA	Letter re: Baseline Sampling/Eastward Migration Sampling at the Midco I and II Sites w/Attachments	
9	06/14/04	Method, T., IDEM	Snyder, P., Federal Aviation Administration	Letter re: Draft Environmental Impact Statement for the Master Plan for Potential Development at the Gary/Chicago International Airport w/Attachment	

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10	06/18/04	Patel, O., Weston Solutions, Inc.	Boice, R., U.S. EPA	E-mail Message re: June 16, 2004 Inspection of On-going Operation and Maintenance at the Midco I and II Sites	2
11	06/23/04	Boice, R., U.S. EPA	Hutchens, R., ENVIRON	E-mail Message re: Midco I and II June 16, 2004 Operaticn and Maintenance Oversight Report	2
12	07/00/04	Weston Solutions, Inc.	U.S. EPA	Remedial Action Oversight Report for Ground Water Sampling and Investigations at the Midco I and II Sites	
13	08/12/04	Roberman, A., U.S. EPA	Boice, R., U.S. EPA	Memorandum re: Approval of First Revised QAPP Addendum for the Midco II Site	1
14	09/03/04	Boice, R., U.S. EPA	Hutchens, R., ENVIRON	Letter re: Midco II Revised Final Design Build Document - Soil Vapor Extraction/Air Sparging (SVE/AS) and Midco I ESD	2
15	10/20/04	Patel, O., Weston Solutions, Inc.	Boice, R., U.S. EPA	E-mail Message re: Summary of Visit to Midco I and II Sites During Quarterly Ef-fluent Sampling	2
16	11/22/04	Westlake, K., U.S. EPA	Snyder, P., Federal Aviation Administration	Letter re: Final Environ-mental Impact Statement for the Master Plan De-velopment Including Runway Safety Area Enhancement/ Extension of Runway 12-30 and other Improvements at the Gary/Chicago Inter-national Airport w/Attached Comments	9
17	04/25/05	Kennington, B., ENVIRON	Boice, R., U.S. EPA	Analytical Results of Bor-row Material for Temporary Vapor Barrier Cover Soils for the SVE System Con-struction at the Midco I and II Sites w/Cover Letter	
18	05/00/05	ENVIRON	U.S. EPA	2004 Annual Ground Water Monitoring Report for the Midco I and Midco II Sites: Volume 1 (Text, Tables and Figures)	

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19	05/00/05	ENVIRON	U.S. EPA	2004 Annual Ground Water Monitoring Report for the Midco I and Midco II Sites: Volume 2 (Appendices A-D)	
20	05/00/05	ENVIRON	U.S. EPA	2004 Annual Ground Water Monitoring Report for the Midco I and Midco II Sites: Volume 3 (Appendices E-H)	
21	05/13/05	Boice, R., U.S. EPA	Kennington, B., ENVIRON	Memorandum re: Midco II Final Design Report (Revision 3), Midco I Technical Memorandum No. 1 and Midco I Inspection	2
22	06/00/05	U.S. EPA	Public	Fact Sheet: Work on Soil Cleanup Plan Begins this Spring - Midco I and Midco II Sites	4
23	06/17/05	Boice, R., U.S. EPA	Moran, F., ENVIRON	E-mail Message re: Approval of Modification to Ground Water Sampling Standard Operating Procedure for the Midco I and Midco II 2005 Annual Sampling Event w/Attachments	3
24	07/12/05	Kennington, B., ENVIRON	Boice, R., U.S. EPA	E-mail Message re: Supplement to Drilling Procedures at the Midco II Site w/Attachments	5
25	07/22/05	Kennington, B., ENVIRON	Boice, R., U.S. EPA	E-mail Message re: Supple- to Health and Safety Procedures at the Midco I and II Sites	1
26	09/08/05	Berman, M., U.S. EPA	Junk, T., Office of the Attorney General	Letter re: Transmittal of the Signature Copy of the Stipulated Order to Amend Statement of Work for the Consent Decree in the Midco Matter (Unsigned)	
27	10/00/05	Weston Solutions, Inc.	U.S. EPA	Remedial Action Oversight Report for SVE and Air Sparging Well Installation at the Midco I and II Sites	
28	10/07/05	Kennington, B. & R. Hutchens, ENVIRON	Boice, R., U.S. EPA	Letter re: Field Sampling Procedures for Baseline and Confirmation Soil Vapor Sampling at the Midco I and Midco II Sites w/Attachment	

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30	10/20/05	Boice, R., U.S. EPA	Kennington, B., ENVIRON	Letter re: Midco I and Midco II Field Sampling Procedures for Soil Vapor Sampling, Modification of Exclusion Zones, Midco I Technical Memorandum 3 and Midco II Schedule w/Attachments	
31	10/27/05	Patel, O., Western Solutions, Inc.	File	E-mail Message re: Observations During October 26, 2005 Midco II Site Visit	1
32	11/00/05	Surface Construction Corp.	ENVIRON	Report of 2005 Mechanical Integrity Testing and Ambient Reservoir Pressure Monitoring at the Midco I and II Sites	
33	11/00/05	Weston Solutions, Inc.	U.S. EPA	Remedial Action Oversight Report for Ground Water Sampling at the Midco I and II Sites	
34	11/22/05	Patel, O., Weston Solutions, Inc.	Boice, R., U.S. EPA	Letter re: Punch List Items for Construction Completion Inspection at the Midco II Site	2
35	11/29/05	Boice, R., U.S. EPA	File	Conversation Record re: Design for the Midco II SVE/AS System	1
36	12/00/05	Weston Solutions, Inc.	U.S. EPA	Remedial Action Oversight Report for Installation of Temporary Barrier Layer at the Midco I and II Sites	
37	12/08/05	Kennington, B., ENVIRON	Boice, R., U.S. EPA	Letter re: Updated Project Organizational Charts for the SVE/AS Systems at the Midco I and II Sites w/Attachments	4
38	01/00/06	Weston Solutions, Inc.	U.S. EPA	Remedial Action Oversight Report of Baseline Soil Gas Sampling at the Midco I and II Sites	
39	01/03/06	Hutchens, R., ENVIRON	Draschil, S., IDEM	Letter re: Response to Nov. 22, 2005 Violation Letter at the Midco II Site w/Attachments	13

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41	01/23/06	Rzeznik, D., U.S. EPA	Hutchens, R., ENVIRON	Letter re: Review of Results of Tests of Midco Waste Disposal Well (WDW -1), U.S. EPA Underground Injection Control Permit No. IN-089-1I-0014 in Gary, IN	4
42	02/07/06	Boice, R., U.S. EPA	Kennington, B., ENVIRON	Letter re: On-site Storage and Off-site Disposal of Wastes from the Midco I and Midco II Site	2
43	02/28/06	Boice, R., U.S. EPA		E-mail Message re: Midco I and Midco II Waste Disposal w/Attachments	17
44	03/10/06	Hutchens, R., ENVIRON	Service List	Progress Reports: (144-169) for Remedial Design/Remedial Action at the Midco I and II Sites	
45	03/15/06	Boice, R., U.S. EPA	Hutchens, R., ENVIRON	Letter re: Midco I and Midco II Health and Safety Plan w/Attachment	2
46	04/07/06	Kennington, B. & R. Hutchens, ENVIRON	Boice, R., U.S. EPA	Letter re: Response to Comments - Hydrogen Cyanide Detections at the Midco i and Midco II Sites	2
47	04/20/06	Kennington, B. & R. Hutchens, ENVIRON	Boice, R., U.S. EPA	Letter re: Request to Discontinue Ambient Air Monitoring at the Midco I and Midco II Sites w/Attachments	
48	04/20/06	Smith, R., ENVIRON		E-mail Message re: Transmittal of Midco Progress Report No. 167 with Replacement Page and Additional Page Inserted	
49	05/00/06	ENVIRON International Corporation	U.S. EPA	2005 Annual Ground Water Monitoring Report for the Midco I and Midco II Sites	
50	05/00/06	ENVIRON	U.S. EPA	2005 Annual Ground Water Monitoring Report for the Midco I and Midco II Sites (Revised May 2006)	

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51	05/03/06	Boice, R., U.S. EPA	Kennington, B., ENVIRON	E-mail Message re: RTO Inlet Combustion Gas Monitor - Midco II SVE/ AS System	1
52	05/09/06	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Letter re: Revised 2005 Capture Zone Evaluation at the Midco I and Midco II Sites w/Attachments	
53	05/10/06	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Letter re: Request to Temporarily Suspend Ground Water Monitoring at the Midco I and Midco II Sites	1
54	06/02/06	Boice, R., U.S. EPA	Hutchens, R., ENVIRON	Letter re: Midco I and Midco II 2005 Capture Zone Evaluation w/Attached Com- ments	3
55	06/06/06	Kennington, B. & R. Hutchens, ENVIRON	Boice, R., U.S. EPA	Letter re: Response to Request to Discontinue Am- bient Air Monitoring at the Midco I and Midco II Sites w/Attachments	
56	06/14/06	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Quarterly OMM&C and Ambient Air Progress Report No. 1 (Feb. 2006-April 2006) for the SVE/AS System at the Midco II Site	
57	06/16/06	Patel, O., Weston Solutions, Inc.	Boice, R., U.S. EPA	E-mail Message re: Issues Identified During the May 15, 2006 Midco I and Midco II Site Visit	1
58	06/28/06	Boice, R., U.S. EPA	Hutchens, R., ENVIRON	Letter re: Midco I and Midco II Permit Re-applica- tion Class I Non-Hazardous Injection Well	1
59	07/10/06	Patel, O., Weston Solutions, Inc.	Boice, R., U.S. EPA	E-mail Message re: Review Comments on the Quarterly Report and Response Letter	2
60	07/10/06	Boice, R., U.S. EPA	Hutchens, R., U.S. EPA	Letter re: Midco I and Midco II Groundwater Monitoring and Ambient Air Sampling	2

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62	08/02/06	Patel, O., Weston Solutions, Inc.	Boice, R., U.S. EPA	Letter re: Review of Data Validation Submitted with the Baseline Soil Vapor Sampling at the Midco Sites	1
63	09/11/06	Boice, R., U.S. EPA	Kennington, B., ENVIRON	Letter re: Review of Baseline Soil Gas Data from the Midco I and Midco II Site	1
64	09/26/06	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Quarterly OMM&C and Ambient Air Progress Report No. 2 (May 2006-June 2006) for the SVE/AS System at the Midco II Site	
65	10/00/06	Surface Construction Corp.	ENVIRON	Report of 2006 Mechanical Integrity Testing and Ambient Reservoir Pressure Monitoring at the Midco I and II Sites	
66	10/04/06	Patel, O., Weston Solutions, Inc.	Boice, R., U.S. EPA	Letter re: Review Comments on Quarterly OMM&C and Ambient Air Progress Report No. 2 for the Midco II Site	
67	11/00/06	ENVIRON	Midco Remedial Corporation	Operation, Maintenance, Monitoring, and Closure Plan for the SVE/AS System at the Midco II Site	
68	11/00/06	ENVIRON	Midco Remedial Corporation	Construction Completion Report for the SVE/AS System at the Midco II Site	
69	11/00/06	Bates, W., U.S. EPA	Clous, T., ENVIRON	Letter re: Results of Tests of Midco's WDW #1 (UIC Permit#IN-089-1I-0014) in October 2006	1
70	11/01/06	Roy, S.,	File	Memorandum re: Review of Midco's October 6, 2006 Ambient Reservoir Monitoring Test Conducted at the WDW#1 Well	2

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72	12/21/06	Boice, R., U.S. EPA	Kennington, B., ENVIRON	Letter re: Midco I and Midco II Operation, Maintenance, Monitoring, and Closure Plans; Construction Completion Reports, Midco I Quarterly Report No. 2; Midco I SVE Operations; 2005 Annual Ground Water Monitoring Report	2
73	01/00/07	Weston Solutions, Inc.	U.S. EPA	Remedial Action Oversight Report for SVE System, Air Sparge System, and Ground Water Sampling at the Midco I and II Sites	
74	01/10/07	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Quarterly OMM&C and Ambient Air Progress Report No. 3 (Aug. 2006-Oct. 2006) for the SVE/AS System at the Midco II Site	
75	01/22/07	Boice, R., U.S. EPA	Distribution List	E-mail Message re: January 22, 2007 Inspection of the Midco I and Midco II Sites	2
76	01/25/07	Boice, R., U.S. EPA	Andrews, S., IDEM	Memorandum re: Review of Midco II SVE/AS Progress Report No. 3 Using Quick-sheets	4
77	01/29/07	Patel, O., Weston Solutions, Inc.	Boice, R., U.S. EPA	Letter re: Review Comments on Quarterly OMM&C and Ambient Air Progress Report No. 3 for the Midco II Site	2
78	01/30/07	Boice, R., U.S. EPA	ENVIRON	E-mail Message re: Transmittal of Review Comments from Weston Solutions on OMM&C Progress Report No. 3 for the Midco II Site	1
79	01/31/07	Boice, R., U.S. EPA	File	Conversation Record re: Midco II SVE/AS Third Quarterly Report	2
80	02/26/07	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Letter re: ENVIRON's Request to Shut Down the Regenerative Thermal Oxidizer at the Midco II Site w/Attachments	4

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82	04/12/07	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Quarterly OMM&C and Ambient Air Progress Report No. 4 (Nov. 2006-Jan. 2007) for the SVE/AS System at the Midco II Site	
83	04/16/07	Boice, R., U.S. EPA	Coughlin, B., ENVIRON	Letter re: Midco I and and Midco II Summa Canister Sampling	1
84	04/18/07	Coughlin, B., ENVIRON	Boice, R., U.S. EPA	Letter re: Monitoring and Restart Procedures for the Regenerative Thermal Oxidizer at the Midco II Site w/Attachments	4
85	04/25/07	IDEM	File	Quick Sheet for Site Midco I and Midco II Site Inspections Conducted on April 25, 2007	1
86	05/01/07	Andrews, S., IDEM	Boice, R., U.S. EPA	E-mail Message re: IDEM's Review of the ENVIRON Monitoring and Restart Procedures for the Regenerative Thermal Oxidizer at the Midco II Site w/Attachments	1
87	05/01/07	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Letter re: Revised Request to Shut Down Hydrogen Peroxide/Ultraviolet Light System at the Midco I and Midco II Sites w/Attached Data Sampling	
88	05/03/07	Andrews, S., IDEM	Hutchens, R., ENVIRON	Letter re: ENVIRON's Request to Shut Down the Regenerative Thermal Oxidizer at the Midco II Site	2
89	05/07/07	Boice, R., U.S. EPA	Hutchens, R., ENVIRON	Letter re: Request to Shut Down the Hydrogen Peroxide/ Ultraviolet Systems at the Midco I and Midco II Sites	2
90	05/07/07	Andrews, S., IDEM	Boice, R., ENVIRON	E-mail Message re: ENVIRON's Request to Shut Down the Regenerative Thermal Oxidizer at the Midco II Site	1

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92	06/08/07	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Annual OMM&C Progress Report No. 1 (Feb. 2006-Jan 2007) for the SVE/AS System at the Midco II Site	
93	06/27/07	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Quarterly OMM&C and Ambient Air Progress Report No. 5 (Feb. 2007-April 2007) for the SVE/AS System at the Midco II Site	
94	07/16/07	Boice, R., U.S. EPA	File	Conversation Record re: Repair/Restart of SVE/AS System at the Midco II Site	3
95	08/00/07	ENVIRON	U.S. EPA	2007 Annual Ground Water Monitoring Report at the Midco II Site	
96	08/13/07	Andrews, S., IDEM	Boice, R., U.S. EPA	Letter re: Quarterly OMM&C Progress Report No. 5 for (Feb. 2007-April 2007) at the Midco II Site	2
97	10/02/07	Coughlin, B., ENVIRON	Boice, R., U.S. EPA	Letter re: Limited Soil Vapor Sampling Event in July 2007 at the Midco II Site w/Attachments	
98	10/05/07	Boice, R., U.S. EPA	Bow, W., LFR	Letter re: Midco I and Midco II Issues Discussed During September 12, 2007	4
99	10/09/07	Coughlin, B., ENVIRON	Boice, R., U.S. EPA	Letter re: Request to Temporarily Suspend Annual Vapor Monitoring Point Sampling at the Midco I and Midco II Sites	2
100	10/16/07	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Quarterly OMM&C and Ambient Air Progress Report No. 6 (May 2007-July 2007) for the SVE/AS System at the Midco II Site	
101	11/00/07	Bates, W., U.S. EPA	Claus, T., ENVIRON	Letter re: Results of Tests of Midco's WDW#1 (Permit #IN-089-1L-0014) in October 2007	1

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103	12/07/07	Andrews, S., IDEM	Boice, R., U.S. EPA	Letter re: Quarterly OMM&C Progress Report No. 6 for (May 2007-July 2007) at the Midco II Site	2
104	01/09/08	Boice, R., U.S. EPA	Andrews, S., IDEM	E-mail Message re: Summary of December 19, 2007 Visit to the Midco Sites	2
105	02/05/08	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Quarterly OMM&C and Ambient Air Progress Report No. 7 (Aug. 2007-Oct. 2007) for the SVE/AS System at the Midco II Site	
106	03/06/08	Andrews, S., IDEM	Boice, R., U.S. EPA	Letter re: Quarterly OMM&C Progress Report No. 7 for (Aug. 2007-Oct. 2007) at the Midco II Site	2
107	03/21/08	Bates, W., U.S. EPA	File	Memorandum re: Review of Midco's October 5, 2007 Ambient Reservoir Monitoring Test at WDW #1 Well	1
108	03/25/08	Boice, R., U.S. EPA	Andrews, S., IDEM	E-mail Message re: Summary of Midco I and Midco II Site Visit	2
109	04/01/08	Andrews, S., IDEM	Boice, R., U.S. EPA	E-mail Message re: Midco II Site Visit, Responses to Questions and Issues	2
110	04/02/08	Boice, R., U.S. EPA	Hardin, E., U.S. EPA	E-mail Messages re: Review of VOC Sampling Procedures at the Midco Sites	2
111	04/07/08	ENVIRON	File	Groundwater Contour Map - 03/07/08 Shallow Monitoring Well Network at the Midco II Site	1
112	05/01/08	Boice, R., U.S. EPA	Andrews, S., IDEM	Memorandum re: Inspections at MNidco I and Midco II on April 28 and 30, 2008	4
113	05/09/08	Andrews, S., IDEM	Boice, R., U.S. EPA	E-mail Message re: Midco II Ground Water Contours Responses to Comments	2

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114	05/15/08	Coughlin, B., ENVIRON	Boice, R., U.S. EPA	E-mail Message re: Responses to Questions and Comments in U.S. EPA's May 12, 2008 E-mail Concerning Midco II Ground Water Contours w/Attachment	4
115	05/23/08	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Quarterly OMM&C and Ambient Air Progress Report No. 8 (Nov. 2007-Jan. 2008) for the SVE/AS System at the Midco II Site	
116	05/30/08	Andrews, S., IDEM	Boice, R., U.S. EPA	E-mail Message re: K. Johnson's Summary of Field Activities Observed During Oversight of the May 28th SVE/AS Sampling Event at the Midco II Site	2
117	06/20/08	ENVIRON	File	Groundwater Contour Maps - 05/01/08 - Deep Monitoring Well Network at the Midco II Site w/Attached Pumping Rates	3
118	06/23/08	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Annual OMM&C Progress Report No. 2 (Feb. 2007-Jan 2008) for the SVE/AS System at the Midco II Site	
119	06/25/08	Andrews, S., IDEM	Boice, R., U.S. EPA	Letter re: Quarterly OMM&C Progress Report No. 8 for (Nov. 2007-Jan. 2008) at the Midco II Site	2
120	07/29/08	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Quarterly OMM&C and Ambient Air Progress Report No. 9 (Feb. 2007-April 2008) for the SVE/AS System at the Midco II Site	
121	08/22/08	ENVIRON	File	Groundwater Contour Maps - 08/13/08 - Deep Monitoring Well Network at the Midco II Site w/Attached Pumping Rates	3
122	08/25/08	Andrews, S., IDEM	Boice, R., U.S. EPA	Letter re: Annual OMM&C Progress Report No. 2 for the Midco II Site	1
123	08/26/08	Andrews, S., IDEM	Boice, R., U.S. EPA	E-mail Message re: Summary from Field Visit and Progress Report #194	1

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124	08/26/08	Andrews, S., IDEM	Boice, R., U.S. EPA	E-mail Message re: August 2008 Midco II Ground Water Contour Maps	1
125	09/03/08	Bates, W., U.S. EPA	Claus, T., ENVIRON	Letter re: Approval for Proposed Procedures for a Temperature Log and Radio-active Tracer Survey in Midco WDW #1	1
126	09/08/08	Boice, R., U.S. EPA	Andrews, S., IDEM	Letter re: Midco I and Midco II Five-Year Reviews	1
127	09/09/08	Hutchens, R., ENVIRON	Service List	Progress Reports: (170-196) for Remedial Design/Remedial Action at the Midco I and II Sites	
128	09/09/08	Andrews, S., IDEM	Boice, R., U.S. EPA	Letter re: Quarterly OMM&C Progress Report No. 9 for (Feb. 2007-April 2008) at the Midco II Site	2
129	09/12/08	U.S. EPA	File	Master SL Table Run for the Midco I and Midco II Sites	
130	09/29/08	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Quarterly OMM&C and Am-bient Air Progress Report No. 10 (May 2007-July 2008) for the SVE/AS System at the Midco II Site	
131	10/00/08	ENVIRON International Corporation	U.S. EPA	2008 Annual Ground Water Monitoring Report for the Midco I and Midco II Sites	
132	10/08/08	Hutchens, R., ENVIRON	Service List	Memorandum re: Progress Report No. 197 September 1-30, 2008 RD/RA for the Midco I and Midco II Sites	
133	11/01/08	Environ International Corporation	U.S. EPA	Report of 2008 Five-Year Mechanical Integrity Testing and Ambient Reservoir Pressure Monitoring for Midco Waste Disposal Well No. 1	
134	11/03/08	Coughlin, B., ENVIRON	Boice, R., U.S. EPA	Letter re: Limited Soil Vapor Sampling Event August 2008 for the Midco II Site	

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135	11/05/08	Andrews, S., IDEM	Boice, R., U.S. EPA	Letter re: Third Five-Year Review Report for the Midco II Site	2
136	11/07/08	Hutchens, R., ENVIRON	Service List	Memorandum re: Progress Report No. 198 October 1-31, 2008 RD/RA for the Midco I and Midco II Sites	
137	12/08/08	Hutchens, R., ENVIRON	Service List	Memorandum re: Progress Report No. 199 November 1-30, 2008 RD/RA for the Midco I and Midco II Sites	
138	12/15/08	Andrews, S., IDEM	Boice, R., U.S. EPA	Letter re: Quarterly OMM&C Progress Report No. 10 May-July 2008 SVE System for the Midco II Site	2
139	12/18/08	Hutchens, R., ENVIRON	Boice, R., U.S. EPA	Memorandum re: Quarterly OMM&C Progress Report No. 11 August-September 2008 SVE/AS System for the Midco II Site	
140	12/19/08	Andrews, S., IDEM	Boice, R., U.S. EPA	Letter re: Third Five-Year Review Reports for the Midco I and Midco II Sites	1
141	01/08/09	Hutchens, R., ENVIRON	Service List	Memorandum re: Progress Report No. 200 December 1-31, 2008 RD/RA for the Midco I and Midco II Sites	

TABLE 3-1

PARAMETER-SPECIFIC CLEAN-UP ACTION LEVELS AND ASSOCIATED PARAMETERS [1]
MIDCO I AND II SITES
GARY, INDIANA

Parameter	Background		Project-Specific QL	MCL	AWQC x F		Risk-Based Carc.	Risk-Based Noncarc.	Parameter-Specific CAL [2]	
	Midco I	Midco II			Midco I	Midco II			Midco I	Midco II
Volatile Organic Compounds										
Acetone	--	6.9	5	--	--	--	--	3,240	3,240	3,240
Benzene	--	0.04	1	5	--	--	2.69	--	2.69	2.69
2-Butanone	--	--	5	--	--	--	--	588	588	588
Carbon tetrachloride	--	--	1	5	--	--	0.6	23	1	1
Chlorobenzene	--	--	1	100	--	--		48.8	48.8	48.8
Chloroform	--	--	1	--	--	--	1.2	324	1.2	1.2
1,2-Dibromo-3-chloropropane	--	--	1	0.2	--	--	--	--	1	1
1,2-Dibromoethane	--	--	1	0.05	--	--	--	--	1	1
1,2-Dichlorobenzene	--	--	1	600	--	--	--	398	398	398
1,4-Dichlorobenzene	--	--	1	75	--	--	13.5	7,187	13.5	13.5
1,1-Dichloroethane	--	--	1	--	--	--	--	138	138	138
1,2-Dichloroethane	--	--	1	5	--	--	0.86	--	1	1
1,1-Dichloroethene	--	--	1	7	--	--	0.074	290	1	1
cis-1,2-Dichloroethene	--	--	1	70	--	--	--	--	70	70
trans-1,2-Dichloroethene	0.16	6.1	1	100	--	--	--	--	100	100
1,2-Dichloropropane	--	--	1	5	--	--	4.76	--	4.76	4.76
Ethylbenzene	--	--	1	700	--	--	--	3,240	700	700
Methylene chloride	1.3	1.9	1	5	--	--	6.27	1,830	5	5
4-Methyl-2-pentanone	--	--	5		--	--	--	1,620	1,620	1,620
Styrene	--	--	1	100	--	--	--	--	100	100
1,1,2,2-Tetrachloroethane	--	--	1		--	--	0.39	--	1	1
Tetrachloroethene	--	--	1	5	--	--	5.27	324	5	5
Toluene	--	--	1	1,000	--	--	--	4,990	1,000	1,000
1,2,4-Trichlorobenzene	--	--	1	70	--	--	--	29.4	29.4	29.4
1,1,1-Trichloroethane	--	--	1	200	--	--	--	1,500	200	200
1,1,2-Trichloroethane	--	--	1	5	--	--	1.37	129	1.37	1.37
Trichloroethene	--	--	1	5	--	--	6.23	--	5	5
Vinyl chloride	1.32	2.2	1	2	--	--	0.1	--	1.32	2.2
Xylenes (total)	--	--	5	10,000	--	--	--	3,860	3,860	3,860
Semivolatile Organic Compounds										
Benzoic acid	--	--	20	--	--	--	--	129,450	129,450	129,450
bis(2-Ethylhexyl)phthalate	1.5		5	6	--	--	23.1	647	6	6
Butyl benzyl phthalate	--	--	5	--	--	--	--	6,472	6,472	6,472
4-Chloroaniline	--	--	5	--	--	--	9.25	129	9.25	9.25
Di-n-butyl phthalate	--	0.3	5	--	--	--	--	3,236	3,236	3,236
2,4-Dichlorophenol	--	--	20	--	--	--	--	97.1	97.1	97.1
Diethyl phthalate	--	--	5	--	--	--	--	25,890	25,890	25,890
Hexachlorobenzene	--	--	5	1	--	--	--	--	5	5
Hexachlorocyclopentadiene	--	--	5	50	--	--	--	--	50	50
Isophorone	--	--	5	--	--	--	78.9	4,854	78.9	78.9
2-Methylphenol	--	--	5	--	--	--	--	1,618	1,618	1,618
4-Methylphenol	--	--	5	--	--	--	--	1,618	1,618	1,618
Naphthalene	--	--	10	--	--	--	--	12,945	12,945	12,945
Nitrobenzene	--	--	5	--	--	--	--	4.46	5	5
n-Nitrosodiphenylamine	0.26	--	5	--	--	--	66.0		66.0	66.0
Pentachlorophenol	--	--	20	1	50.7	--	--	971	20	20
Phenol	--	--	10	--	--	--	--	19,417	19,417	19,417
Chlorinated Pesticides										
Aldrin	--	--	0.01	--	--	--	0.019	0.971	0.019	0.019
γ-BHC (Lindane)	--	--	2	0.2	--	--	--	--	2	2
Chlordane	--	--	0.01	2	--	--	0.249	1.62	0.249	0.249
4,4'-DDT	--	--	0.02	--	--	--	0.952	16.2	0.952	0.952
Dieldrin	--	--	0.005	--	0.00741	--	0.0202	1.62	0.00741	0.00741
Endrin	--	--	0.02	2	0.00897	--	--	9.71	0.02	2
Heptachlor	--	--	0.01	0.4	--	--	--	--	0.4	0.4
Heptachlor expoxide	--	--	0.01	0.2	0.0148	0.0137	--	--	0.0148	0.0137
Methoxychlor	--	--	0.1	40	--	--	--	--	40	40
Toxaphene	--	--	1	3	--	--	--	--	3	3
Polychlorinated Biphenyls										
Polychlorinated biphenyl compounds	--	--	0.41	0.5	0.0546	--	0.0420	--	0.41	0.41

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PARAMETER-SPECIFIC CLEAN-UP ACTION LEVELS AND ASSOCIATED PARAMETERS [1]
MIDCO I AND II SITES
GARY, INDIANA

Parameter	Background		Project-Specific QL	MCL	AWQC x F		Risk-Based Carc.	Risk-Based Noncarc.	Parameter-Specific CAL [2]	
	Midco I	Midco II			Midco I	Midco II			Midco I	Midco II
Polycyclic Aromatic Hydrocarbons										
Benzo(a)anthracene	--	--	0.001	--	--	--	2.81	--	2.81	2.81
Benzo(b)fluoranthene	--	--	0.005	--	--	--	0.0938	--	0.0938	0.0938
Benzo(a)pyrene	--	--	0.001	0.2	--	--	0.0281	--	0.0281	0.0281
Chrysene	--	--	0.005	--	--	--	2.81	--	2.81	2.81
Dibenzo(a,h)anthracene	--	--	0.0025	--	--	--	0.0281	--	0.0281	0.0281
Indeno(1,2,3-cd)pyrene	--	--	0.005	--	--	--	2.81	--	2.81	2.81
Herbicides										
2,4-D	--	--	30	70	--	--	--	--	70	70
Dinoseb	--	--	1	7	--	--	--	--	7	7
2,4,5-TP (Silvex)	--	--	4	50	--	--	--	--	50	50
Inorganic Analytes										
Antimony	--	--	1	6	--	--	--	12.9	6	6
Arsenic	6	15.1	2	10	187	173	0.18	32.4	6	15.1
Barium	118	107	20	2,000	--	--	--	1,620	1,620	1,620
Beryllium	--	--	1	4	20.7	19.1	--	162	4	4
Cadmium	--	0.15	1	5	4.68	10.4	--	32.4	4.68	5
Chromium (III)	8	7.5	1	100	858	2,010	--	32,400	100	100
Chromium (VI)	8	7.5	10	--	42.9	39.6	--	162	42.9	39.6
Copper	--	25.2	1	--	50.7	120	--	--	50.7	120
Cyanide	10.4	158	10	200	20.3	18.7	--	647	20.3	158
Iron	3,880	15,300	50	--	3,900	3,600	--	--	3,900	15,300
Lead	--	5.6	1	--	13.7	53.6	--	--	13.7	53.6
Manganese	1,400	464	25	--	--	--	--	6,470	6,470	6,470
Mercury	--	0.25	0.2	2	0.0468	0.0432	--	9.71	0.20	0 25
Nickel	58	12.3	7		655	1,580	--	647	647	647
Selenium	--	--	2	50	137	126	--	97.1	50	50
Silver	--	4.6	1		0 468	0.432	--	--	1	4.6
Thallium	--	--	3	2	156	144	--	2.27	3	3
Vanadium	4.33	--	1				--	227	227	227
Zinc	--	1,470	1		1,330	3,160	--	6,470	1,330	3,160

Notes:

MCL = Primary maximum contaminant level, from 40 CFR 141, as of July 2002.
AWQC x F = Site-specific chronic ambient water quality criteria (AWQC), equal to the federal AWQC for protection of aquatic life times the site-specific factor F, from Table 2 of Attachment 2 of the Midco I and II Statement of Work, dated June 1992.
Background = Site-specific background ground water concentrations: from Table 1 of Attachment 2 of the Midco I and II Statement of Work, dated June 1992.
QL = Quantitation Limit.
Carc. = Carcinogenic risk-based concentration equivalent to 1E-05 carcinogenic risk for the individual parameter.
Noncarc. = Noncarcinogenic risk-based concentration equivalent to a noncarcinogenic hazard index of 1 for the individual parameter.
CAL = Clean-up Action Level.
-- = Value not specified or not calculated.

[1] All concentrations are given in micrograms per liter.

[2] Lowest value between the MCL, AWQC, and the risk-based concentrations calculated for the individual parameter, but not less than the project-specific detection limit or the site-specific background concentrations.